FOOD Manufacture

PACKAGING

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP

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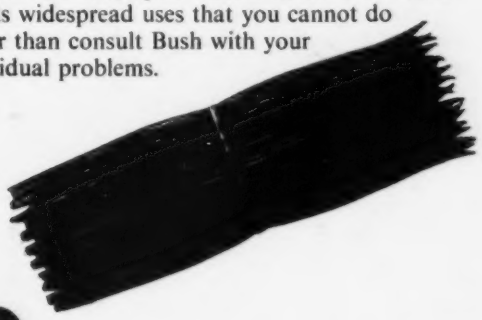
MEXICO

discovered

Vanilla Beans

Discovery is not enough. Credit is due also to those who utilise nature's raw materials. It is so with Vanilla Beans, whether they come from Mexico, Reunion, Madagascar, Comoro Islands or elsewhere. For over a century the House of Bush has developed Vanilla Essence and such are its widespread uses that you cannot do better than consult Bush with your individual problems.



BUSH

BUSH *perfected*

VANILLA ESSENCE

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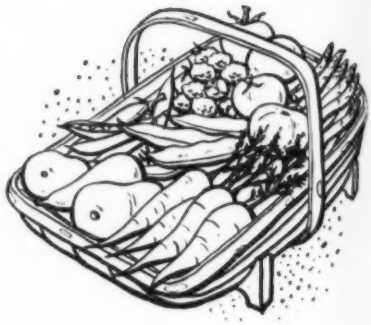
PFAUDLER



PFAUDLER FOR FRUIT AND VEGETABLE CANNING AT **KEARLEY & TONGE**

The high reputation for quality, flavour and purity of their food products enjoyed by Kearley & Tonge is maintained by persistent diligence in all stages of manufacture and by careful selection of processing equipment.

One of a series of single shell 180 gallon open Pfaudler Glassed-steel tanks supplied to Kearley & Tonge Ltd.

Pfaudler glassed-steel vats were chosen for use with hot brine and syrups in their Canning Department because :—

- *Pfaudler glassed-steel is strong and has a very long life.*
- *The glass lining is hygienic and easy to clean.*
- *The glass lining ensures purity of flavour and consistency of product.*
- *All Pfaudler equipment is backed by 12 months' guarantee and an efficient service organisation.*

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Leven, Fife. Tel: Leven 79.

Factories also at: Rochester, New York; Elyria, Ohio; Kobe, Japan; Schwetzingen, Baden, Germany.

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in Scotland's Industry

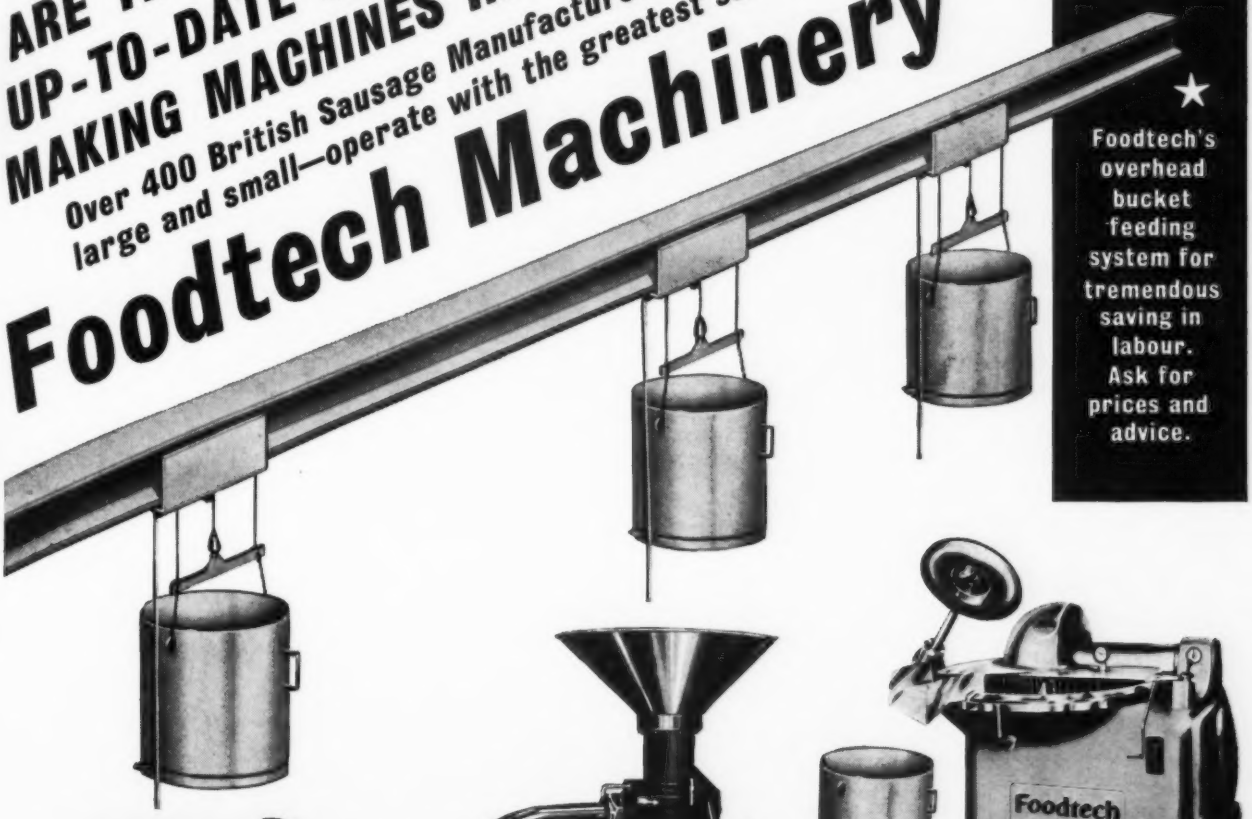
Glassed-steel storage and process vessels, transport tanks for Milk, Food, Brewing and Chemical Industries.

Other Companies in the Balfour Group
Henry Balfour & Co. Ltd.,
George Scott & Son (London) Ltd.

THESE ARE THE MOST UP-TO-DATE SAUSAGE MAKING MACHINES IN THE U.K.

Over 400 British Sausage Manufacturers—both large and small—operate with the greatest success

Foodtech Machinery



★ Foodtech's overhead bucket feeding system for tremendous saving in labour. Ask for prices and advice.

★

Foodtech's Sausage Filler and Linker

- Made for British type sausage.
- 200 sausages every minute at exact weights.
- Straight through filling—no corners—no friction.
- Long life machine.
- 60 lbs. 100 lbs. 170 lbs. up to 440 lbs. capacities.

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Foodtech's Mincemaster

The one and only—unsurpassed—essential in every sausage-making plant, small or large.

Makes every Mincer (Grinder) out of date.

More than 200 now installed in U.K.

K.S.9 small production £496.
K.S.12 small production £578.
K.S.18 medium production £736.
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K.S.46 large production £1,125.
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Ask for Foodtech's advice regarding this machine.

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Foodtech's Famous Cut-Mixer

***Foodtech's famous Cut/Mixer—often copied but never excelled—the result of eighty-five years' craftsmanship:**

***Clean cut.**
***No heating up.**
***Cuts large lumps of fresh or frozen meat.**
***Heavy duty machine.**
***Lasts for a lifetime.**
***Four speeds available.**

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80 ltr.; 100 lbs. English Mix £695.
100 ltr.; 120 lbs. English Mix £875.
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and other types up to 440 lbs. capacity.

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Foodtech Ltd.

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Highest standard of purity and uniformity with full biological activity.
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- **Cake mixes and biscuits**

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F5.

brings Meredith & Drew a rich harvest

WHAT MAKES A SUCCESS in biscuit selling? Well of course you can have a bright new idea, back it with thousands of pounds' worth of promotion, and do very well—for a time. Or you can do what Meredith & Drew have done with their Rich Harvest Digestives—you can put in the very best ingredients, *say* so on the packet, and rest secure in the knowledge that the public won't only buy your biscuits once. They'll go *on* buying them, year after year after year.

Meredith & Drew set great store by the butter content of their Rich Harvest biscuits. "There is nothing like a real butter flavour," they say. Like so many other manufacturers today they know that butter really sells the goods—that many people really want extra quality, and are more than willing to pay a little extra for it.

So if you're not already using butter in your own products, think again. You'll find that it *pays* to use butter, and to say so good and big on the packet.

Issued by the Butter Information Council

MERCURY HOUSE, WATERLOO ROAD
LONDON S.E.1. *Telephone:* WATerloo 5231

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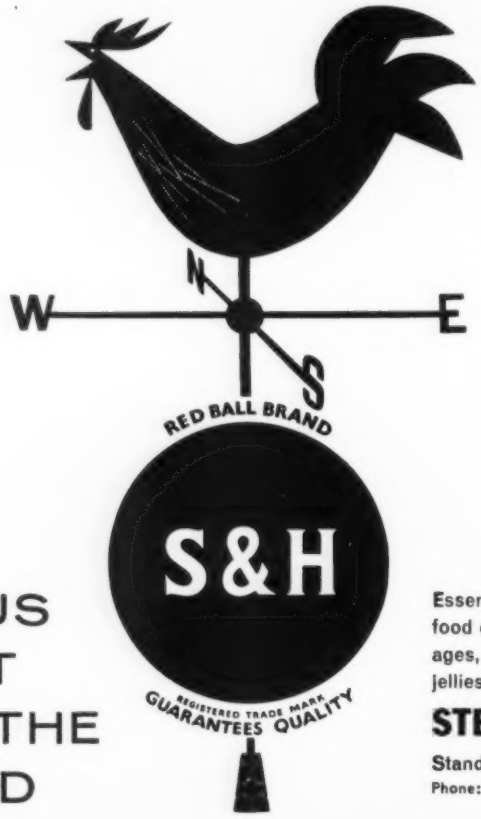

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Essences, fruit juice concentrates, essential oils, food colours, etc., specialised for aerated beverages, fruit juice cordials, confectionery, ices, jellies, biscuits and other food products.

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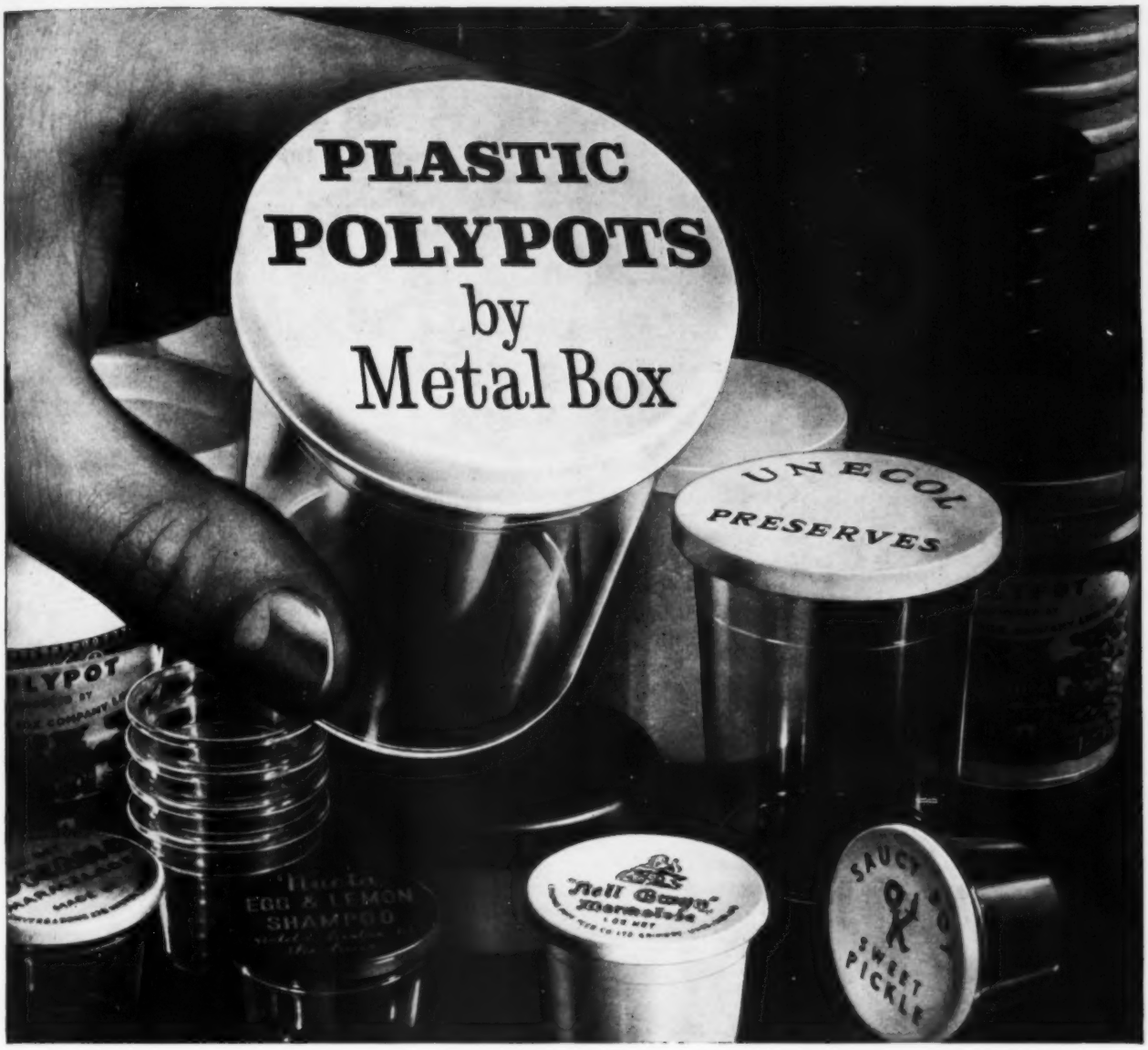
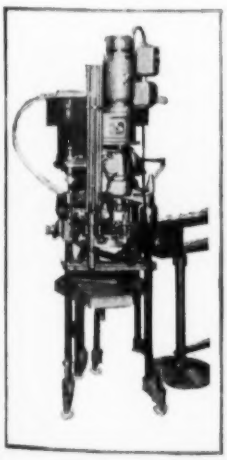
PLASTIC POLYPOTS by Metal Box



Polypots are made of polystyrene; they are well designed, light, tough and splinter-proof. Moulded either clear, or in a variety of brilliant colours, their attractive appearance can be enhanced by Metal Box colour printing on both the pots and the snap-on polythene caps which provide hygienic protection for the contents. Metal Garda caps and paper caps can also be supplied.

For more information write or phone to:



FILL AND CLOSE miniature Polypots with this unique machine. Minimum storage and working area and labour costs make this a really economic proposition.

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Solution: COLT Ventilation

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The Architects, Messrs. Harry S. Fairhurst & Son, F/A.R.I.B.A., who designed this factory for Leyland Motors Ltd. installed Colt Ventilators throughout for three reasons:

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In providing a permanent solution to this ventilation problem Colt have added yet another chapter to their record of success—success which has brought repeat orders from many world-famous concerns Send for a free Data Manual to Dept. 36

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The Vickers development of commercial scale plant means fresh thinking and wider horizons, because the benefits to consumer and processor are so great.

Food can be stored *for years* in sealed packets without refrigeration, and can be restored in a moment so that it looks, tastes and smells exactly as it did at the moment of preservation. Even the colour, the calories and vitamins are the same. All that has gone is the water and the weight—about 90% of it.

Think of the economies in transportation, packaging and storage! Think of the opportunities to expand sales to markets that are now closed owing to high freightage costs or lack of cold storage facilities! Think even more of the opportunities for automatic vending! The implications are endless.

TODAY

Many processors at home and abroad have been familiarising themselves with the technique using the low-cost pilot plant and full-scale commercial plant is now installed.

TOMORROW?

Vickers laboratories are constantly extending the list of freeze-dried foods that can be effectively and profitably marketed. Invite Vickers engineers to examine the application of this new process to your business.

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South Marston Works Swindon England *Telephone Stratton St. Margaret 3241*

In addition to Accelerated Freeze Drying Plant, Vickers-Armstrongs (South Marston) Limited are working on technically advanced government and industrial engineering contracts for the General Post Office, the United Kingdom Atomic Energy Authority, the British Transport Commission and the War Office. The Company's design departments renowned in many fields, are at work on Food Processing Plant, Linear Accelerators for Radiotherapy, Radiation Sterilisation Equipment, Hovercraft, Nuclear Research, and Nuclear Training Equipment.

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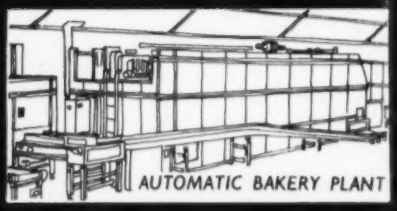
The big new name in Bakery Engineering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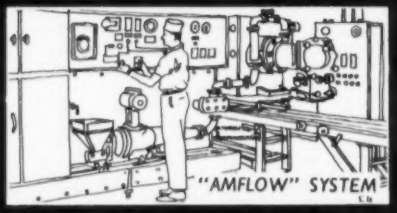
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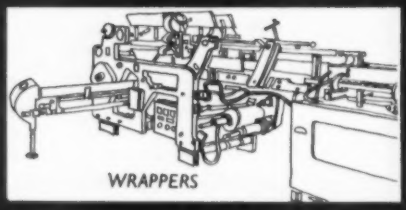
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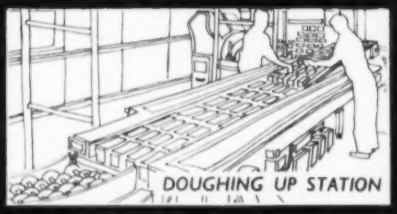
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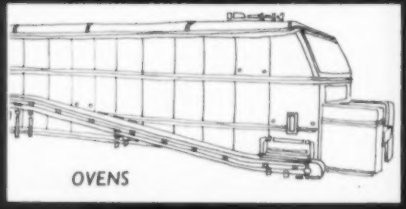
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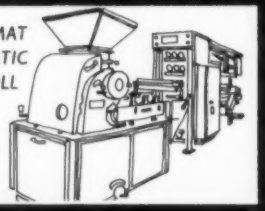

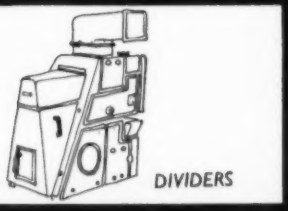
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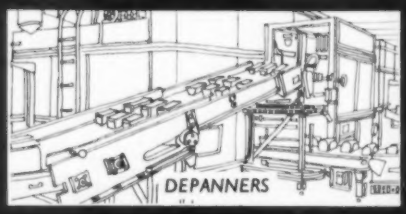
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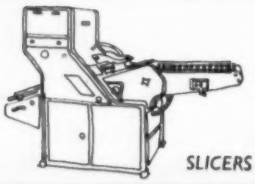
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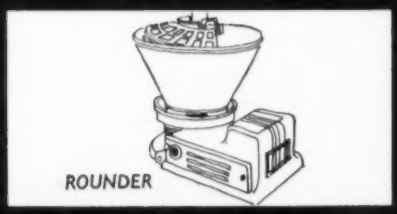
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Whether you're contemplating one replacement machine or a completely new fully-automated bakery, see SIMON-A M F first. SIMON-A M F resources cover every stage from mixing the dough to wrapping the finished product. The best of British, American and continental machinery is now available, backed by the SIMON-A M F service that includes everything—planning, design, building, machinery installation and full servicing of all bakery equipment.

See SIMON-A M F for a complete range of bakery equipment

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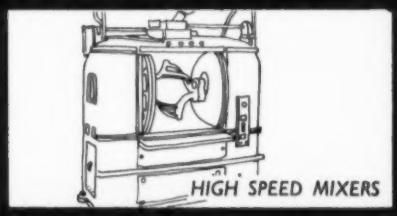
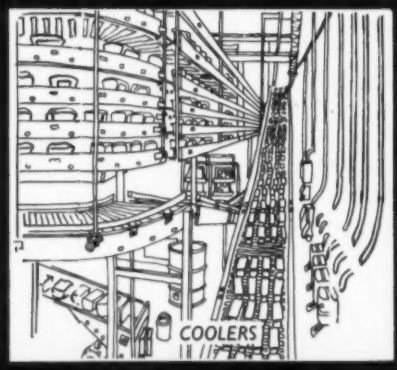

HIGH SPEED MIXERS


COOLERS

Now! Gels without sugar for dietetic foods

Sauces · fruit jells · aspics · relishes · desserts · low-calorie jams.

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With EXCHANGE LOW METHOXYL PECTIN, you can now make a *full line* of gelled foods of any degree of sweetness – even sugar free and low in calories for diabetics and dedicated weight-watchers!

L. M. Pectin is the only pectin that forms a true gel without sugar. The gels keep their shape and firmness at room temperature – yet are tender, elastic, sparklingly brilliant and perfect for flavour.

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BCH ONION TOPPING & TAILING MACHINE

Brit. Patents Nos. 650653, 744306. Other U. K. and Foreign Patents Pending.

With one girl, over 70 per minute—10 cwts. per 8 hour day.

SOME EXPRESSIONS OF APPRECIATION FROM THE PICKLE TRADE:

"Your Topping and Tailing Machines have been a Godsend to us. With them we have overcome our labour problem. We have been running your machines for many months now and have had no breakdowns and little maintenance."

●

"Your Topping and Tailing Machine is a real success and a tremendous help. The saving in labour is so clear and easily reckoned that the machine will soon pay for itself. We intend to place an order for some more."

●

"With your machines we now have a bigger and more uniform output from 6 girls than we had from 25/30 hand workers previously.

WE CAN HELP YOU— DEMONSTRATIONS ARRANGED

and PEELING—

WHAT SOME OF OUR CUSTOMERS SAY:

"Your Peelers have been in use many months now and with very good results."

●

"We have made a modification to your Peeler and now obtain results practically equal to hand peeling."

●

"We find the new Stone Disc and new type Easy-Ride Deflector, a big improvement."

●

". . . your Peelers also save us a great deal of valuable room. The automatic door opener is a valuable feature."

With acknowledgement to H. Smith (Purito Products) Ltd.

Battery of 6 machines tops and tails over 3 tons per 8 hour day. All machines deliver to one conveyor feeding to peeling machines.

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B.H.C. 318 is the most powerful sterilising quaternary/ detergent ever produced. That is why it is the most successful of today's industrial cleaner/sterilisers. Look at these advantages:—

BHC 318 Searches into every crevice and lifts off unwanted deposits

BHC 318 Wipes out bacteria, yeasts and mould

BHC 318 Cleans tanks, pipes, cocks, filters

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BHC 318 Rinses 100%

BHC 318 Has a pH about 9 as a 1% solution

BHC 318 Contains highest percentage of sterilising agent, BHC 2008, so giving complete sterility

BHC 318 Has all constituent materials thoroughly compatible and 100% rinsable

BHC 318 Includes a special corrosion inhibitor and safeguards all metal surfaces

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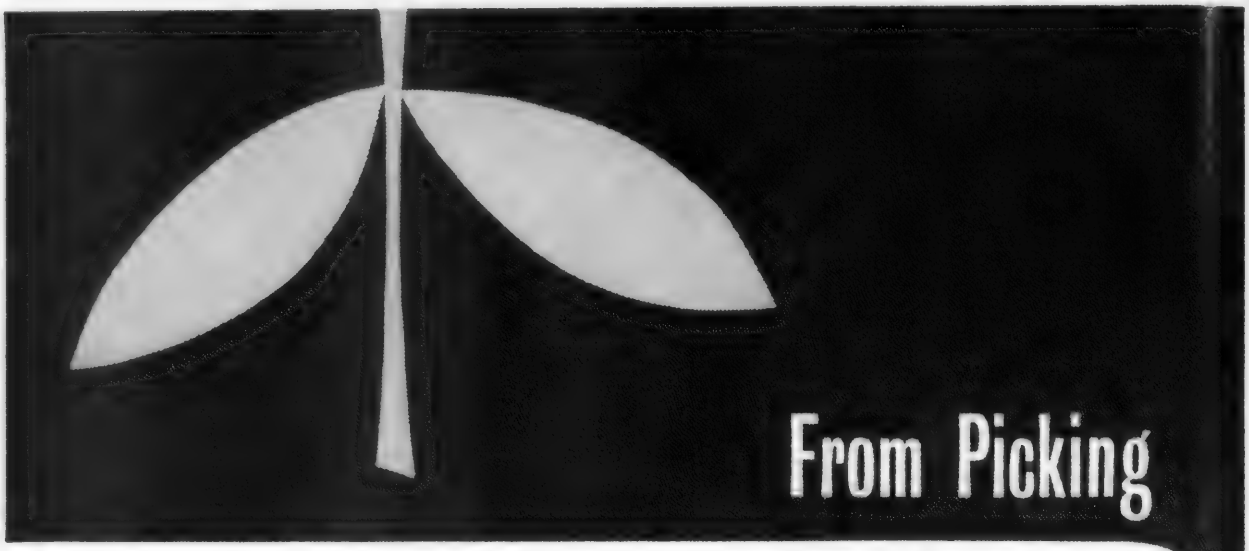
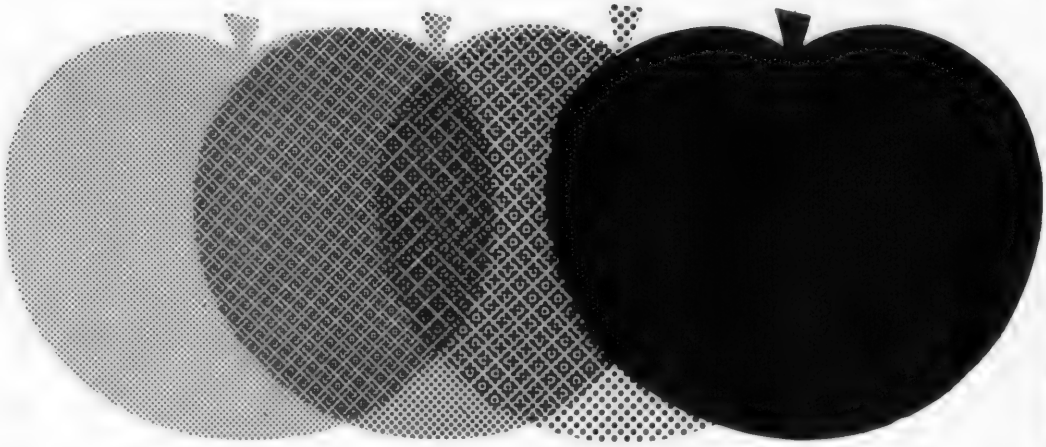


From Picking

To Packing



BY **BTR** PLUVICOR FOOD BELTING

...specially developed for bulk handling of foodstuffs so that each stage of food transfer can be effected without risk of odour or flavour contamination. Non-toxic, resistant to alkalis, acid, grease and water, and with a low coefficient of friction, BTR PVC White Conveyor Belting, is particularly suitable for conveying wet and sticky materials. Light in weight, flexible, easily cleaned, non-staining and fire-resistant... specify BTR Pluvicor Food Belting for all your food handling requirements.

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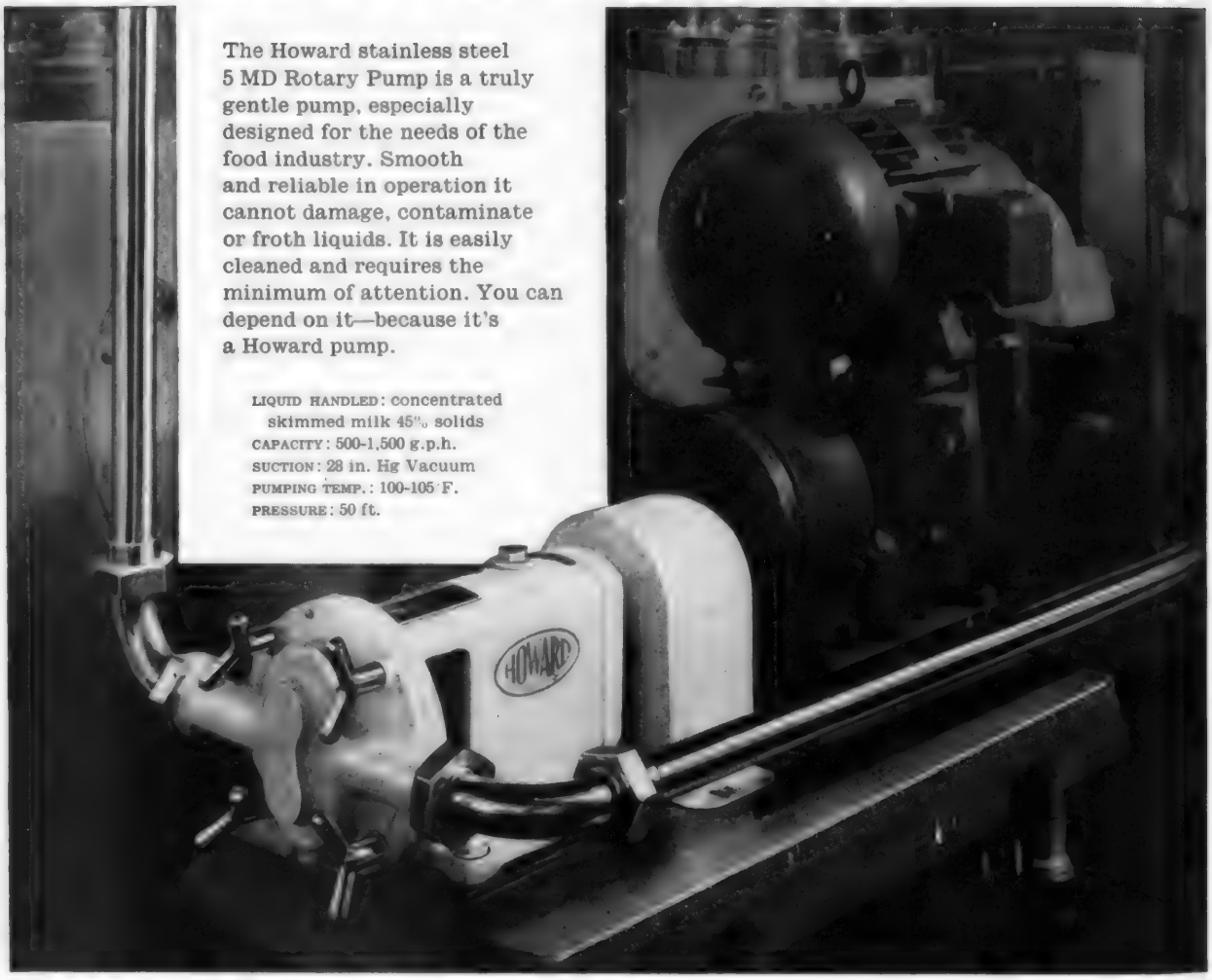
They pump gently at Cow & Gate . . .



The Howard stainless steel 5 MD Rotary Pump is a truly gentle pump, especially designed for the needs of the food industry. Smooth and reliable in operation it cannot damage, contaminate or froth liquids. It is easily cleaned and requires the minimum of attention. You can depend on it—because it's a Howard pump.

LIQUID HANDLED: concentrated skimmed milk 45% solids
CAPACITY: 500-1,500 g.p.h.
SUCTION: 28 in. Hg Vacuum
PUMPING TEMP.: 100-105° F.
PRESSURE: 50 ft.

Photo by courtesy of Cow & Gate Ltd.

. . . and they pump with Howard

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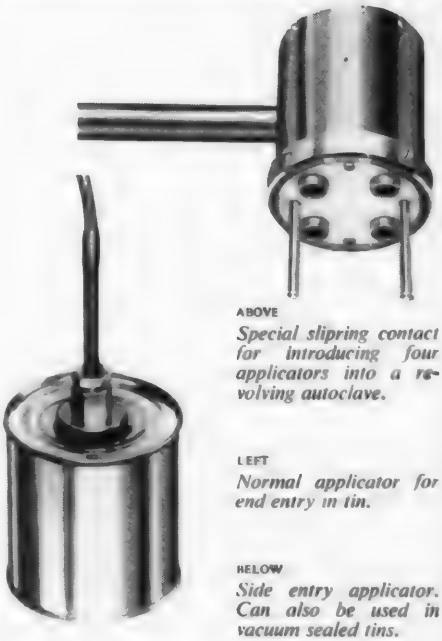
A PRECISION ELECTRIC THERMOMETER *DESIGNED* FOR FOOD MANUFACTURE CONTROL AND RESEARCH

The TEC electric precision thermometer is used by some of the largest tinned food manufacturers in the country, and has many vital advantages which ensure greater accuracy *plus* easier operation.

The thermometer will register up to fifteen applicators at one time, allowing a direct reading. Battery operated, it has automatic compensation for room temperature and a normal range of 0—130°C.

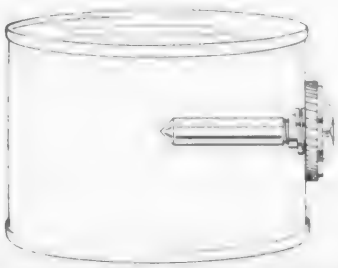
Applicators can be inserted before or after filling and sealing without the use of solder. Types are available for side or end entry into can.



ABOVE
Special slipring contact for introducing four applicators into a revolving autoclave.

LEFT
Normal applicator for end entry in tin.

BELOW
Side entry applicator. Can also be used in vacuum sealed tins.



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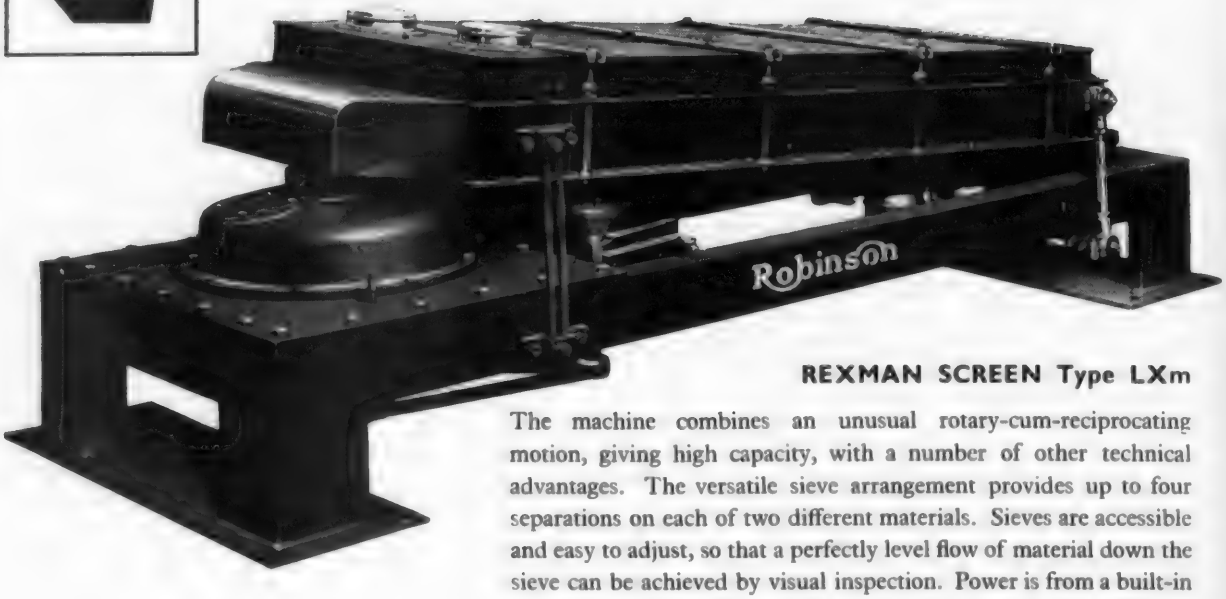


REXMAN SCREEN Type LXm

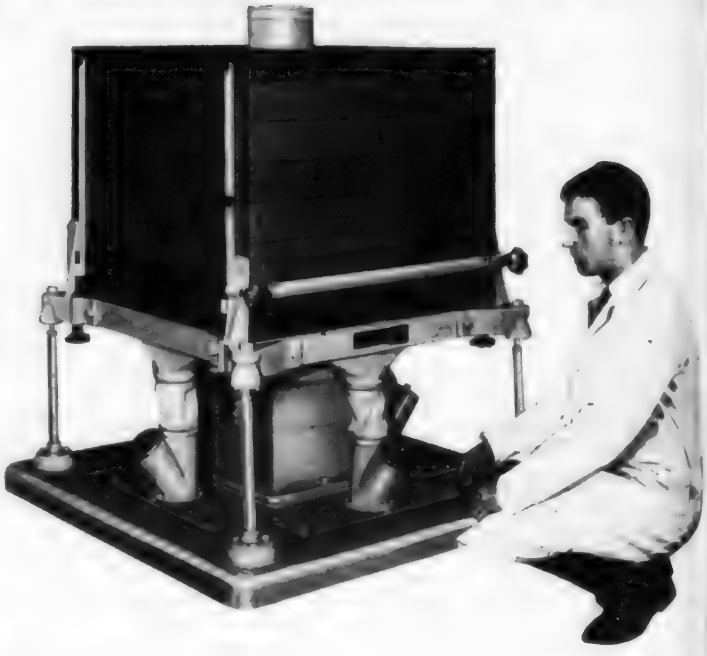
The machine combines an unusual rotary-cum-reciprocating motion, giving high capacity, with a number of other technical advantages. The versatile sieve arrangement provides up to four separations on each of two different materials. Sieves are accessible and easy to adjust, so that a perfectly level flow of material down the sieve can be achieved by visual inspection. Power is from a built-in motor, transmitted through a patented gearless balance drive—proved more reliable and maintenance-free than any other type.

TWO SIFTERS-EACH SUPREME IN ITS CLASS!

2

MINISIFTER
Type PcTm

Simple in construction and operation, the Minisifter offers a large effective sieving area, and has a remarkably high capacity for low floor space occupied. Measuring 4 ft. by 4 ft. at base, it gyrates entirely within its base area. It is fitted with wide delivery channels, ensuring freedom from chokes, and with interchangeable square sieves and loose cover frames. Clothing changes and alterations to flow can be effected in a matter of minutes. The streamlined design reduces maintenance and cleaning to a minimum.



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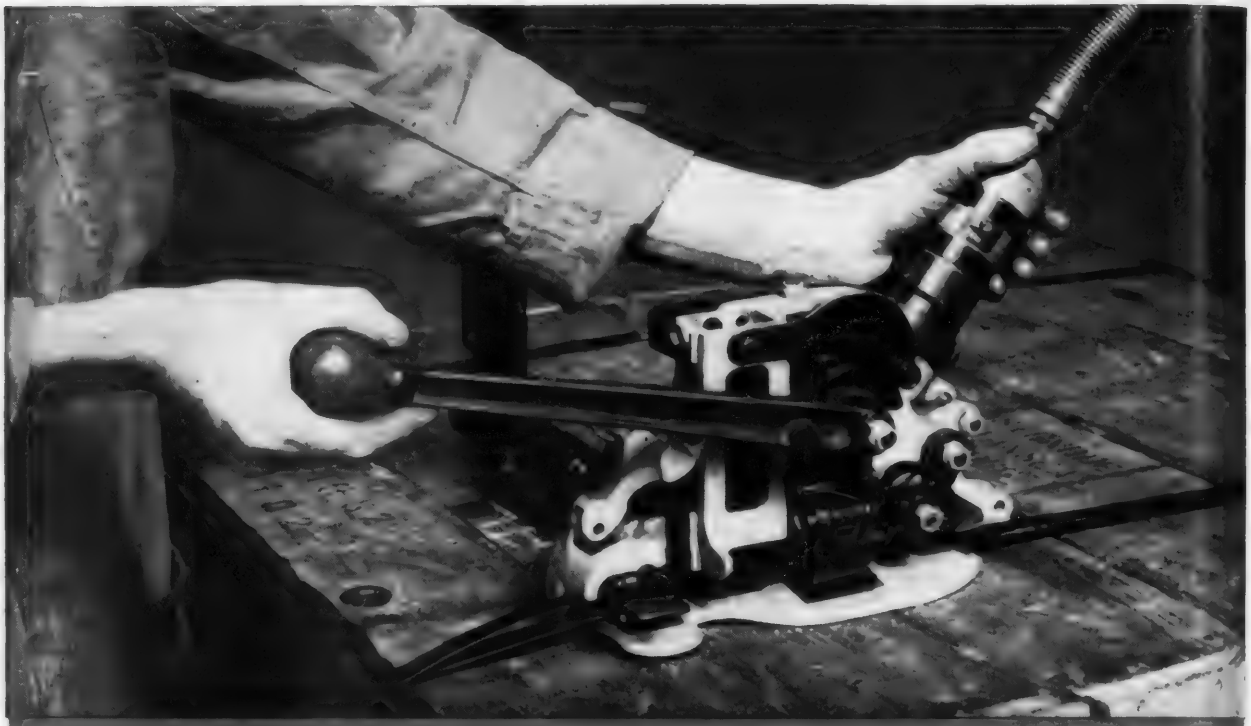

BUNDLE...BOX...BALE

If you tie your shipments...
here are 12 pointers to superior results at less cost

1 Steel strapping is strong. Even our smallest size has a tensile strength of over 400 pounds; our largest, over 15,000 pounds. This strength is unaffected by age, heat, cold, moisture, or dryness.

2 And it is low in cost. For equal lengths of equal strength, we haven't found anything that costs less than steel.

3 Tension is what binds your load together, or reinforces your package. You can pull high tension with steel strapping, and it holds without stretching.

4 Signode steel strapping is a quality product, carefully made and constantly improved to do its job better. It is available from Signode in a wide range of sizes.

5 Because it is well made, Signode steel strapping is smooth, pleasant and safe to handle.

6 It is firm and straight, easy to put on square, without kinks, twists, or tangles.

7 It is flexible enough to loop easily around a package or bundle and to pull tight around corners.

8 It is joined by a visible, inspectable mechanical seal that is dependable in spite of dirt, moisture, or oil.

9 It cannot be slipped on and off your package, bundle or bale . . . prevents pilferage.

10 It can be applied at any desired speed, without waste, with fast Signode hand tools, power tools, and automatic machines.

11 Signode men train your operators, keep Signode tools in good order, suggest ways to reduce your cost and improve your results. Signode has specialized in steel strapping for over 45 years.

12 There is a Signode manufacturing plant in South Wales, with its own sources of steel, to assure you of the steel strapping you need, even in times of shortage.

* *First in Steel Strapping!*

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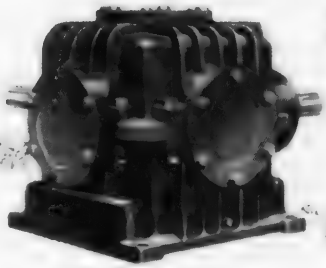
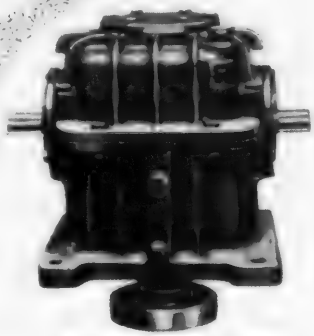
SPIRAL OF FALLING COSTS



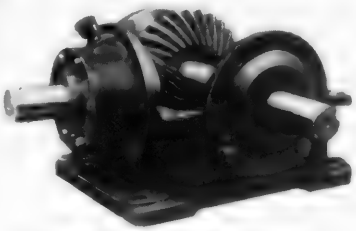
'RADIATION' HORIZONTAL UNIT



'RADIATION' VERTICAL UNIT

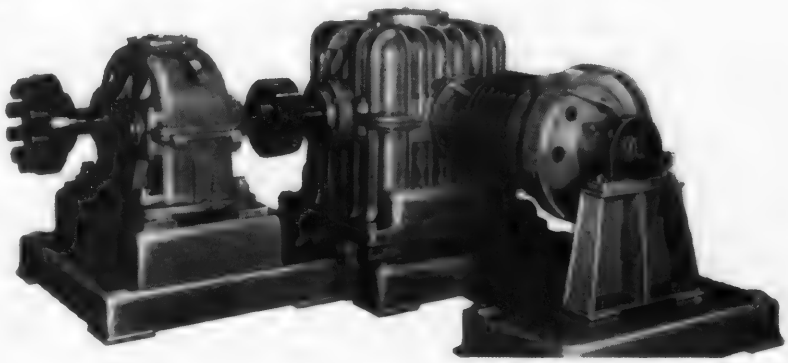
If you are watching costs you will do well to install Crofts 'RADIATION' Spiral Bevel Gear Units. They are precision generated to give accurate and continuous tooth engagement; they lower noise levels, reduce maintenance and production costs, and ensure the optimum use of expensive power.

Available in both horizontal and vertical types these units transmit powers from fractional to 1,100 h.p. and provide speed ratios from 1:1 to 5:1.



STANDARD SPIRAL BEVEL GEAR-BOX

For economical and most efficient power-transmission specify Crofts "RADIATION" Spiral Bevel Gear Units. (Full technical data available in our Publication 611.)



Paper Mill Drive comprising Single Helical Reduction Gear, Spiral Bevel Gear Unit and Airflex Clutch arrange with V-pulley. The complete drive mounted on combination baseplate, is of Crofts manufacture.

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CROFTS (ENGINEERS) LIMITED

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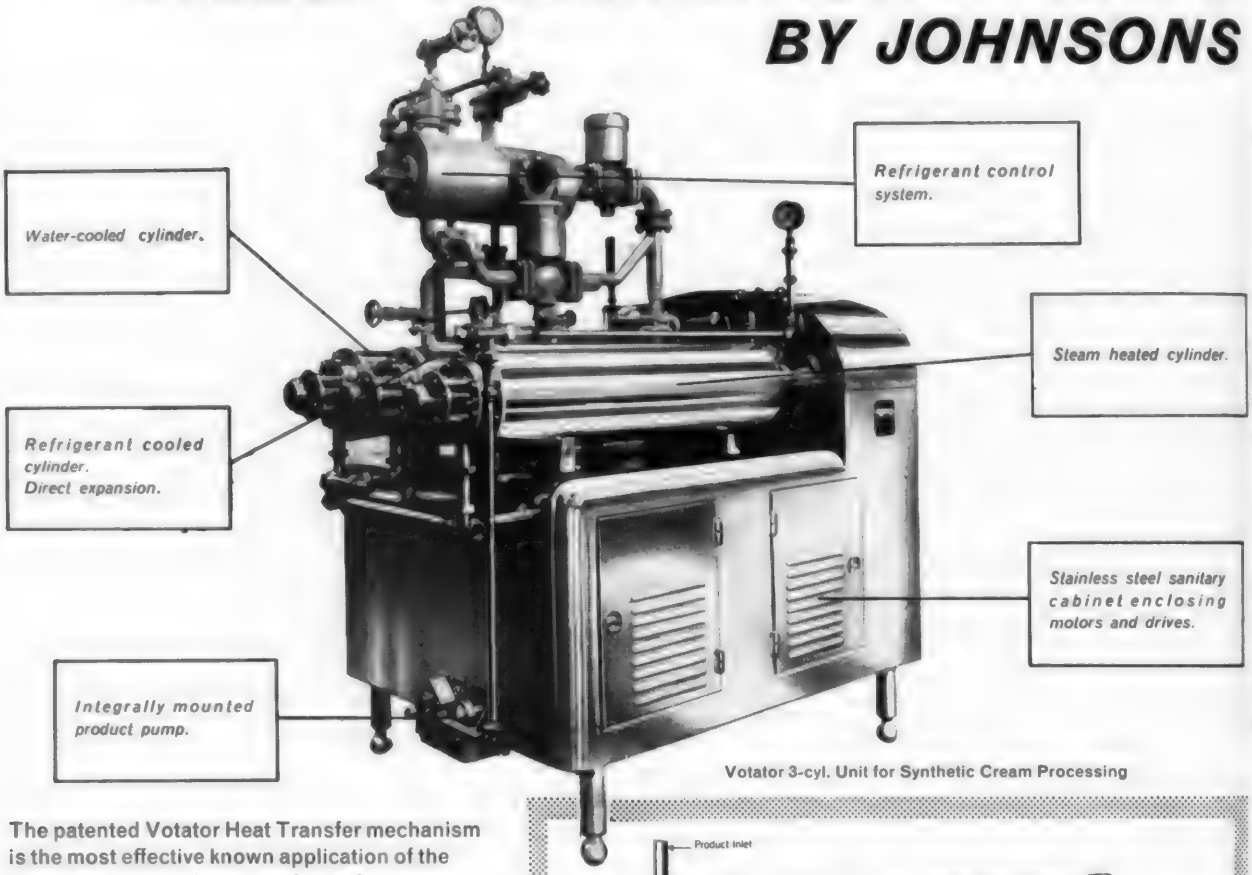
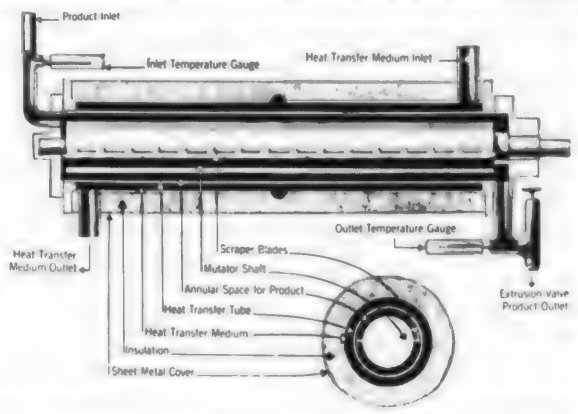
Votator* SCRAPED SURFACE HEAT TRANSFER PLANT BY JOHNSONS


Refrigerant control system.
Water-cooled cylinder.
Steam heated cylinder.
Refrigerant cooled cylinder. Direct expansion.
Stainless steel sanitary cabinet enclosing motors and drives.
Integrally mounted product pump.

Votator 3-cyl. Unit for Synthetic Cream Processing

The patented Votator Heat Transfer mechanism is the most effective known application of the theory that a clean heat transfer surface, combined with a high ratio of surface to volume of material being treated, gives the best results in the rapid cooling or heating of a continuous flow of liquid or viscous products.

Shown here is a Votator 3-cylinder unit for the rapid heating and cooling of synthetic cream. It is one of many Votator units made by Johnsons for rapid, hygienic and continuous cooling or heating of a great variety of food and confectionery products. A Votator Unit may solve your processing problem. Johnson's engineers and their Votator Pilot Plant Laboratory are ready to help you.



VOTATOR SYSTEMS HAVE THIS HEAT TRANSFER MECHANISM

This mechanism provides a large heat transfer area in relation to the volume of material being treated. It maintains that very desirable balance by constantly scraping the heat transfer surface clean.
Material to be processed is pumped through the narrow, annular passage between the heat transfer tube and the rapidly revolving mutator. Scraper blades attached to the mutator shaft agitate the material and keep the heat transfer surface clean. This dual action effects a high rate of heat transfer with viscous and liquid products. The net result is a remarkable volume of material processed in comparison with size of equipment.

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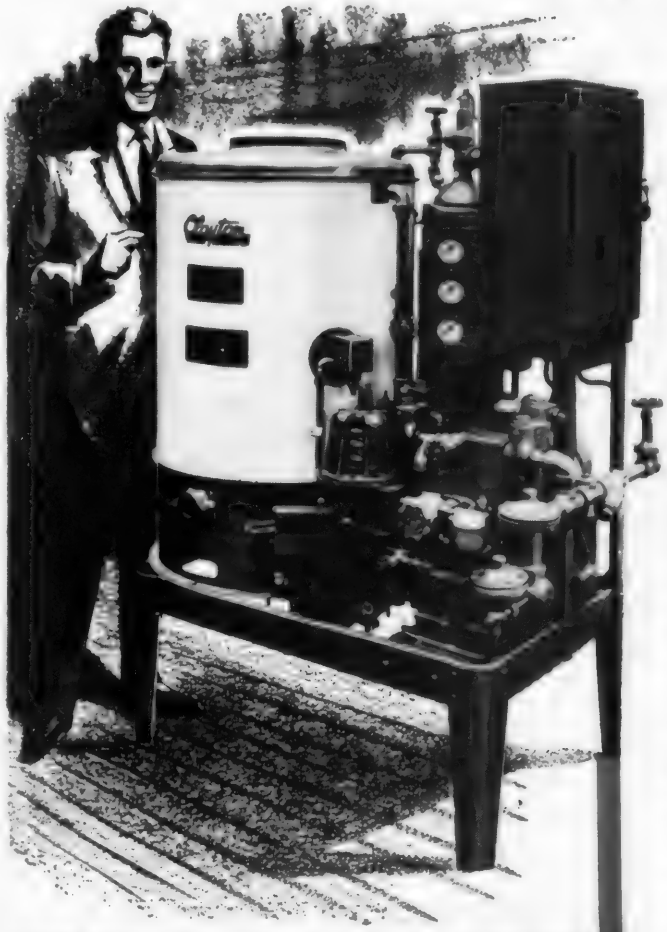
* "Votator" is a trade mark which applies only to the products of The Girdler Process Equipment Division Chemetron Corporation, U.S.A., or their licensees

MORE STEAM *at less cost..*



The principle of forced re-circulation *plus* balanced feed, unique to the CLAYTON steam generator, enables steam production costs to be reduced considerably.

Clayton generators produce a greater output per pound of weight, per foot of space and per shillingsworth of fuel. They are simple to operate and cost less to install.

..and the answer to your

SPACE PROBLEM

With the constantly increasing value of space, the need for economical use of floor area becomes more and more important.

Today it is practical to save up to 75% space on your steam production. The compact size of the Clayton steam generator takes minimum floor space and headroom and permits the installation of a generator of larger capacity even in the most limited space, or the use of space previously too small for a boiler of the conventional type. You can obtain from a Clayton steam generator up to four times the output per square foot of space.

For heating, processing and other auxiliary services Clayton steam generators give:—

- ★ **reduced fuel costs**
- ★ **immediate automatic operation from manual cold start**
- ★ **full operating pressure in less than five minutes**
- ★ **automatic adjustment to meet all steam requirements**
- ★ **maximum safety and require minimum maintenance with easy servicing.**

Clayton steam generators are available with capacities ranging from 430 lb/hr. to 4,600 lb/hr. from 60°F. Generators with capacities of 1,450 lb/hr. to 4,600 lb/hr. can be supplied for firing by fuel oil of 200 or 950 secs. viscosity (Redwood No. 1).

TECHNICAL PUBLICATION AVAILABLE ON REQUEST

Clayton

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VFC. 7

where beer is made...

At Brickwoods Brewery, Portsmouth, beer is made by the 'dropping system'. The progress from malt, sugars, hops to the well-known local brew takes place in equipment mounted on three suspended floors. Throughout, the floors are protected by RHEPANOL BA plastic sheeting in an Acalor floor system. Because of its impermeability to moisture, resistance to attack by chemicals and cleaning solutions and the ease with which it can be joined, RHEPANOL BA provides an added insurance against corrosion. An age-proof, rot-proof membrane, it outdates conventional materials. For proofing floors, foundations, walls, roofs, pools, conduits, RHEPANOL BA makes a lifelong barrier.

Flooring by Acalor (1948) Limited, Crawley, Sussex

Acalor lay down

RHEPANOL BA for permanent, practical proofing

(formerly OPPANOL BA)

Architect: Thomas K. Makin, A.R.I.B.A.
Main Contractor: Howe & Bishop Ltd.
Photograph by courtesy of Brickwoods Limited

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The attractive R.O. Seal increases the impulse value of the product at the point of sale.

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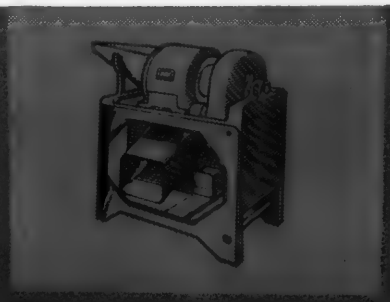

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LISSAPOL

the economical all-purpose liquid detergent.

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Highly effective bactericides for microbiological control.

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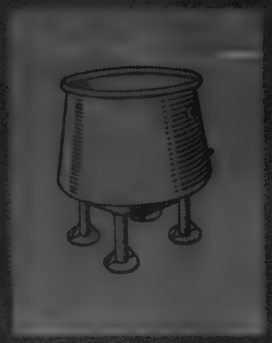

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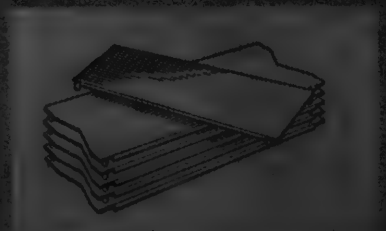

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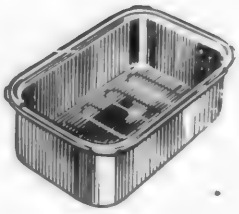

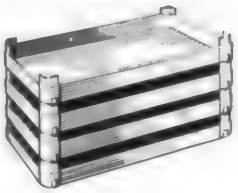

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Trayconomy in the Food Industries...

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...with *Dawson* Tray and utensil washing machines

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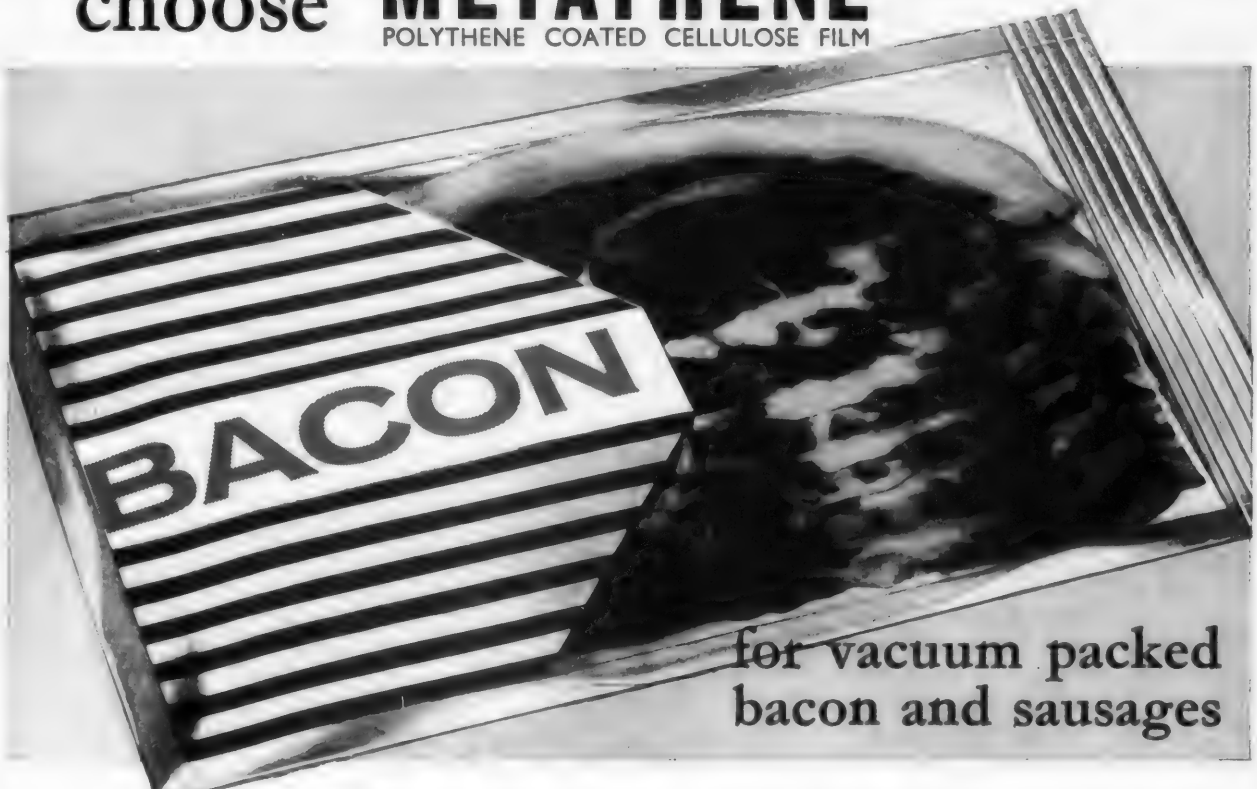

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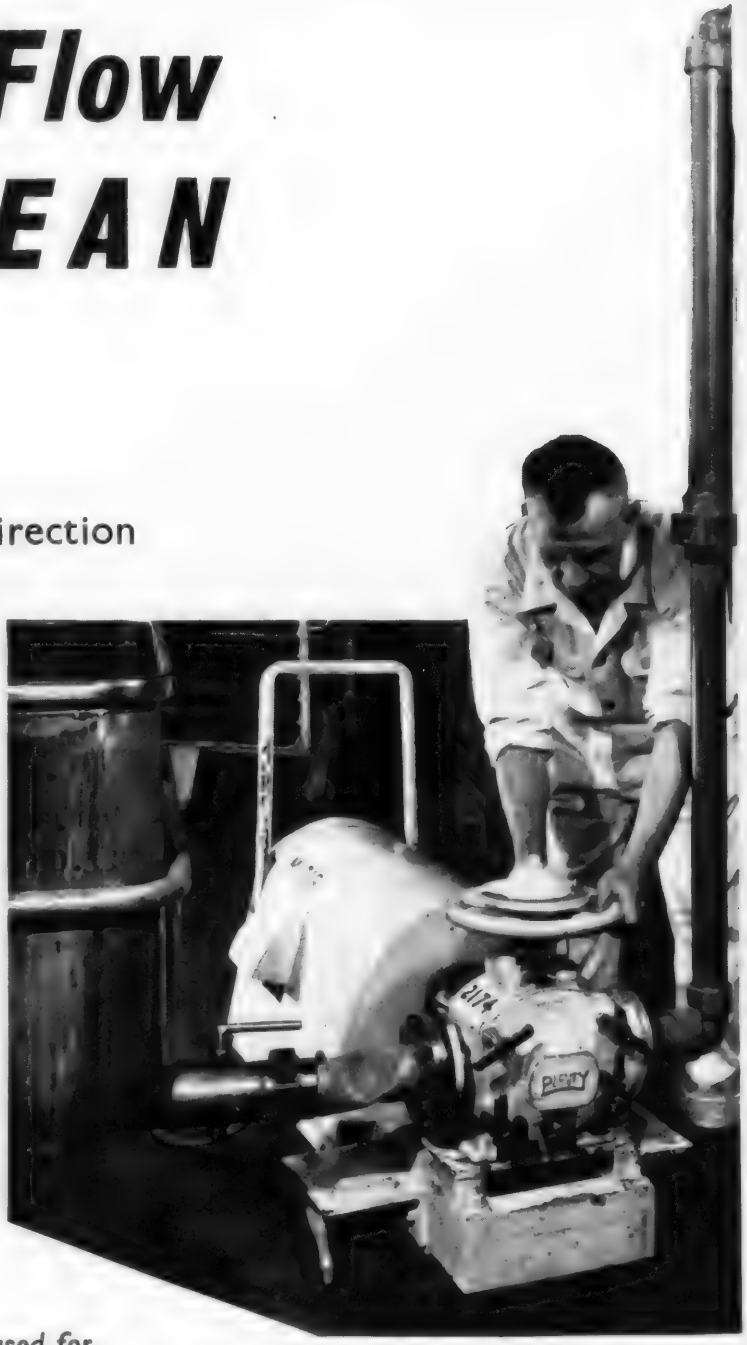

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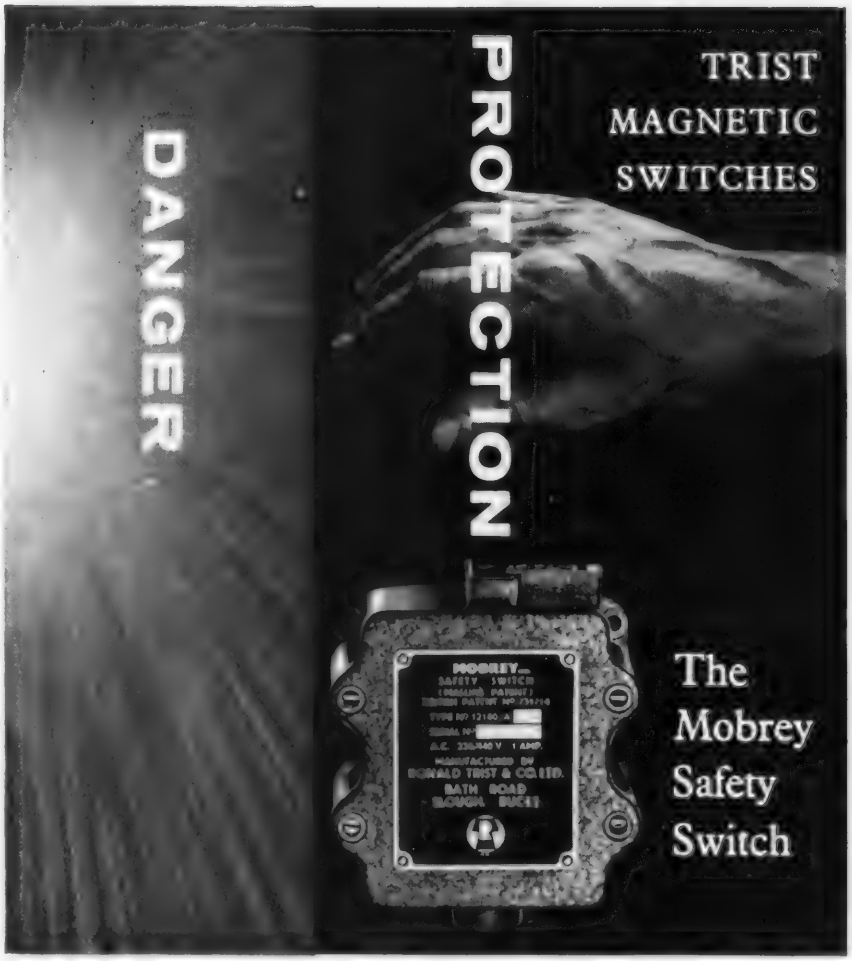

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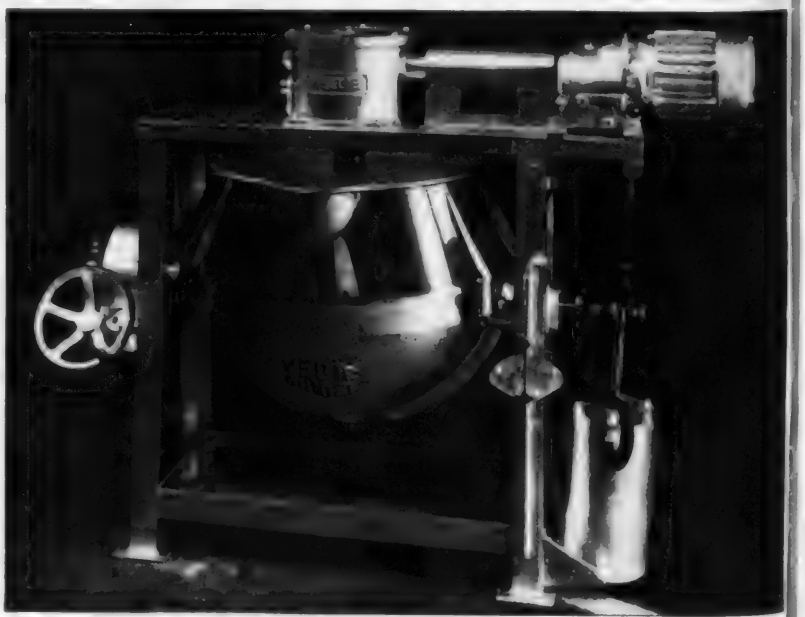
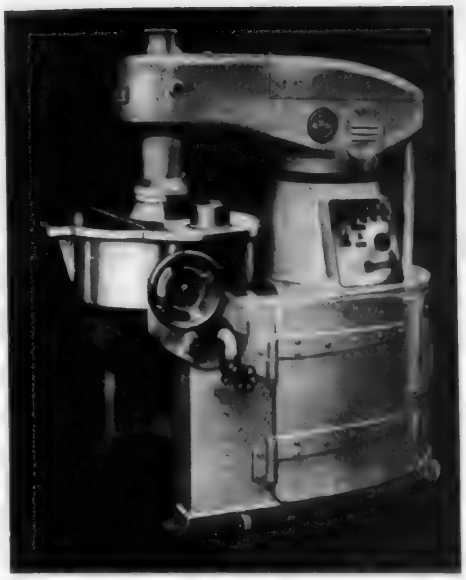


Special Purpose Mixing Machine. Type 23 PJ.



Heavy Duty Hydraulic Mixing Machine for caramel, nougat, etc., 1½ to 3 cwts. capacity. Type 16 PD.

This Mixing Machine has Pan lined with Pure Silver. Type 23 PJ.

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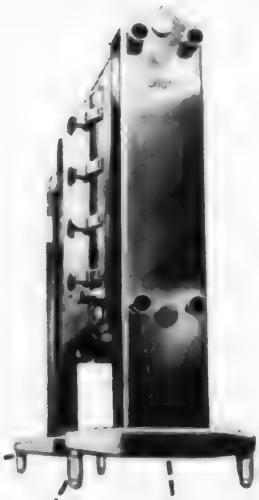
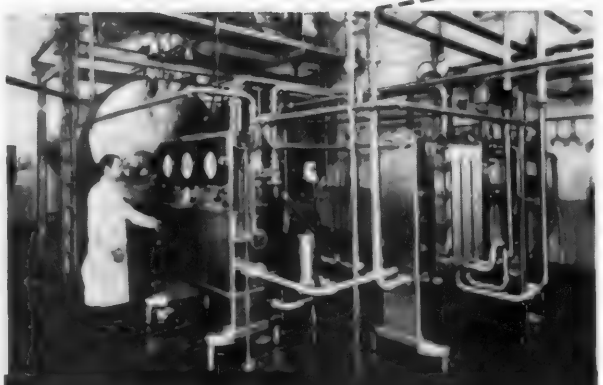
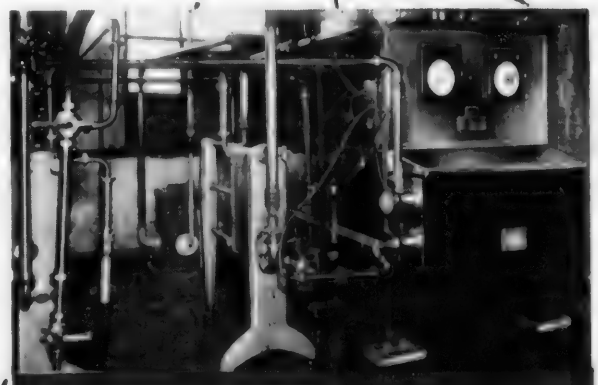
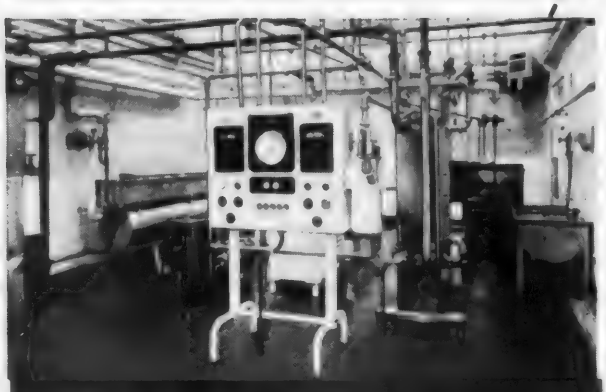




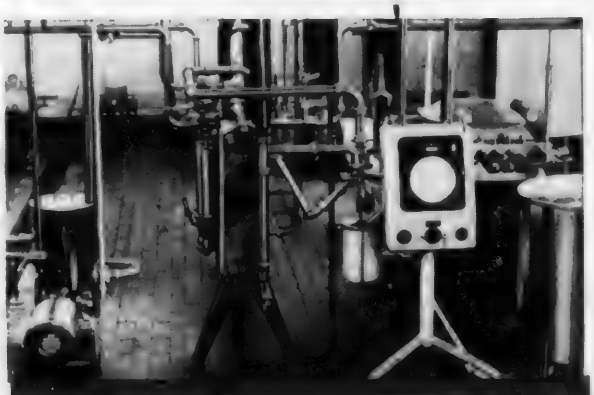
MILK PASTEURISATION



FRUIT JUICE PASTEURISATION



LIQUID EGG PASTEURISATION



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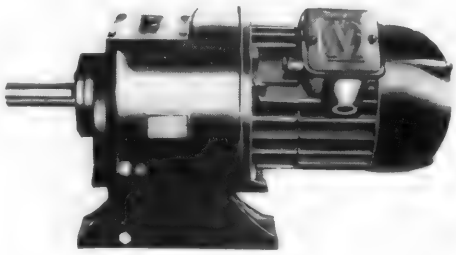

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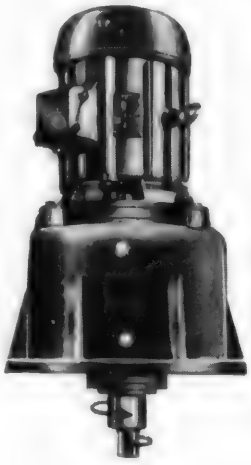

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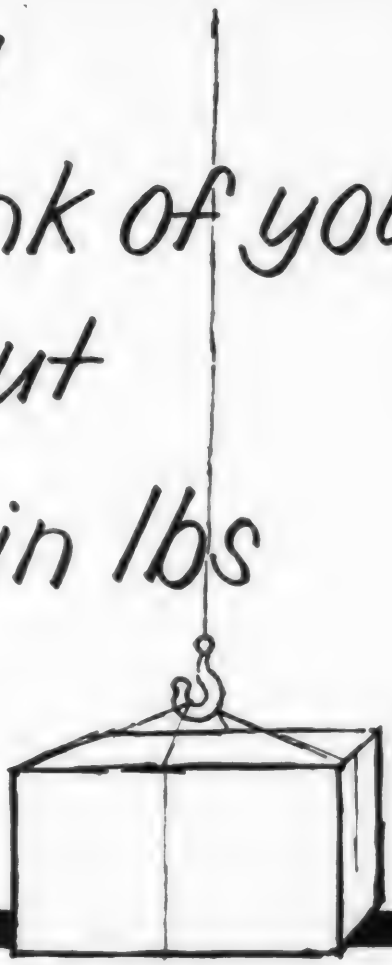

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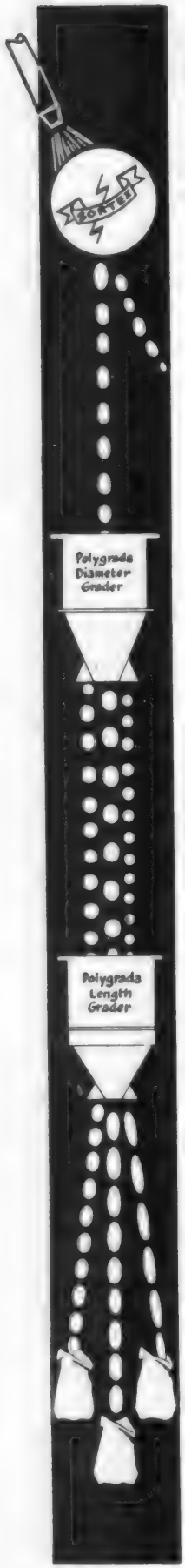

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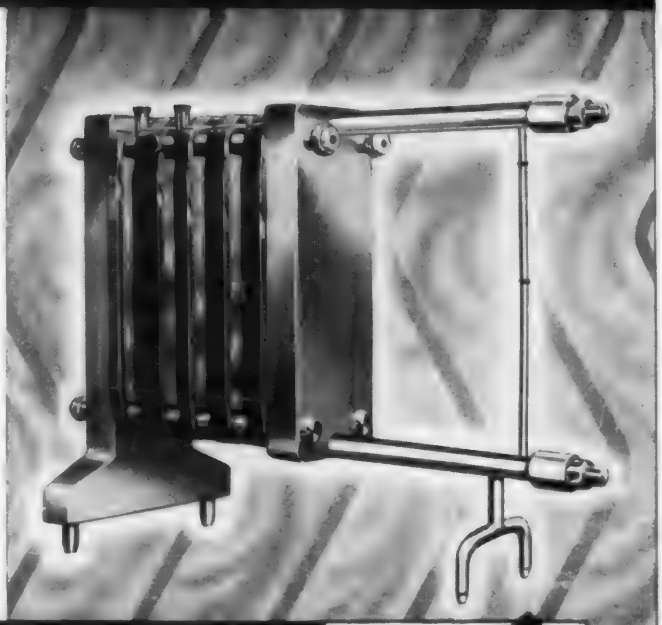

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10 *reasons why you should also choose De Laval:*

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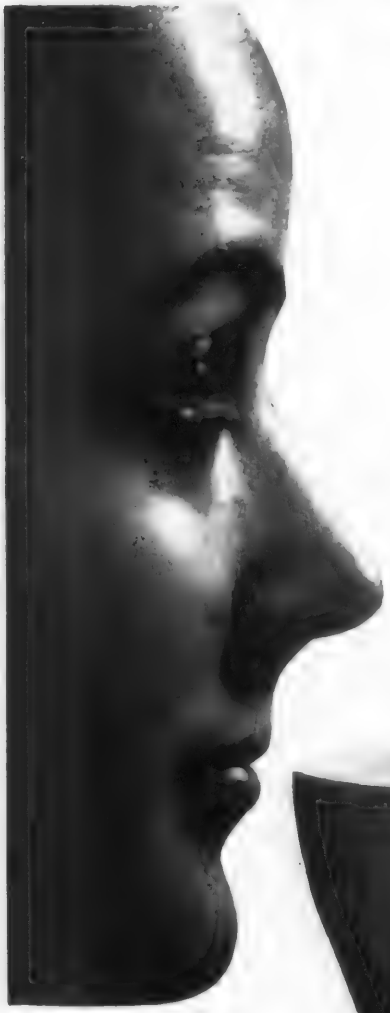
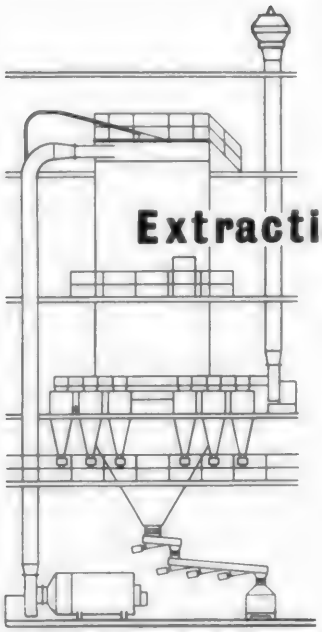
Smee's DL410

Instant Coffee - Instant Tea





Two cups of coffee appear to be identical until tested.
They may have been made from the same blend but will differ in flavour because of different processing equipment and technique.

Extraction governs profits

NIRO ATOMIZER extraction plants are designed for the accurate extraction of Soluble solids to a pre-determined yield pursuant to quality requirements. In the extraction the important yield factors are time and temperature.

Modern pilot plant and research equipment

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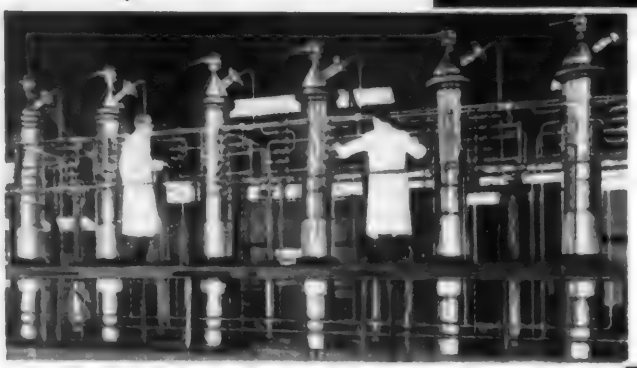

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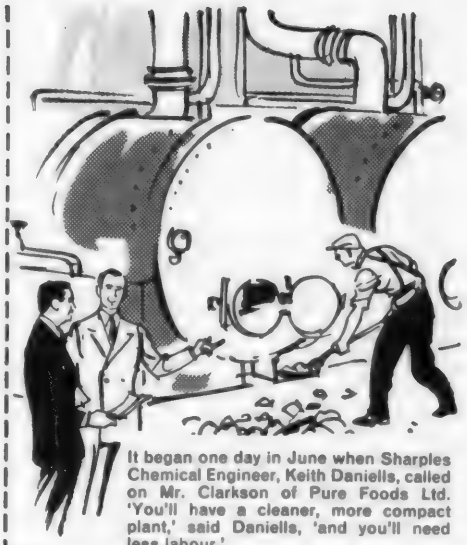
Food manufacturer switches to Sharples centrifugal trimming and fat rendering

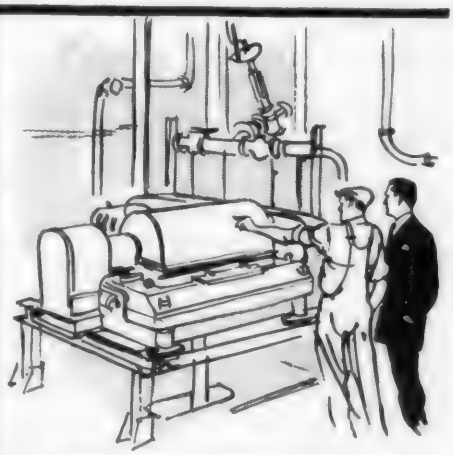
Gets better quality fat and meat product



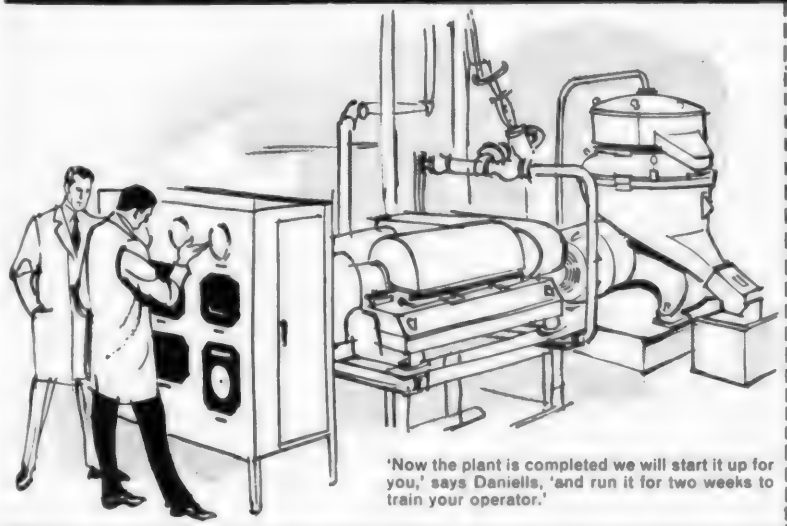
It began one day in June when Sharples Chemical Engineer, Keith Daniells, called on Mr. Clarkson of Pure Foods Ltd. 'You'll have a cleaner, more compact plant,' said Daniells, 'and you'll need less labour.'

'How about product quality?' asked Mr. Clarkson. 'You'll get better quality fat and meat product,' explained Daniells, 'because low temperature prevents degradation of your fat and meat.' He also showed pictures of Sharples plants all over the world.

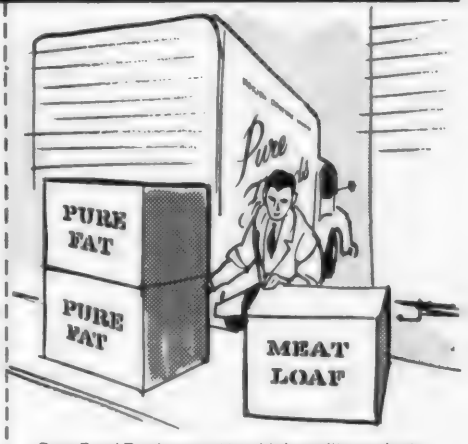
Sharples engineers, after visiting Pure Foods factory and collecting complete information, complete the layout of a plant for Pure Foods particular needs.



Sharples engineers supervise installation of plant on the site. Sharples carry the load so that Mr. Clarkson has no worries or problems.



'Now the plant is completed we will start it up for you,' says Daniells, 'and run it for two weeks to train your operator.'



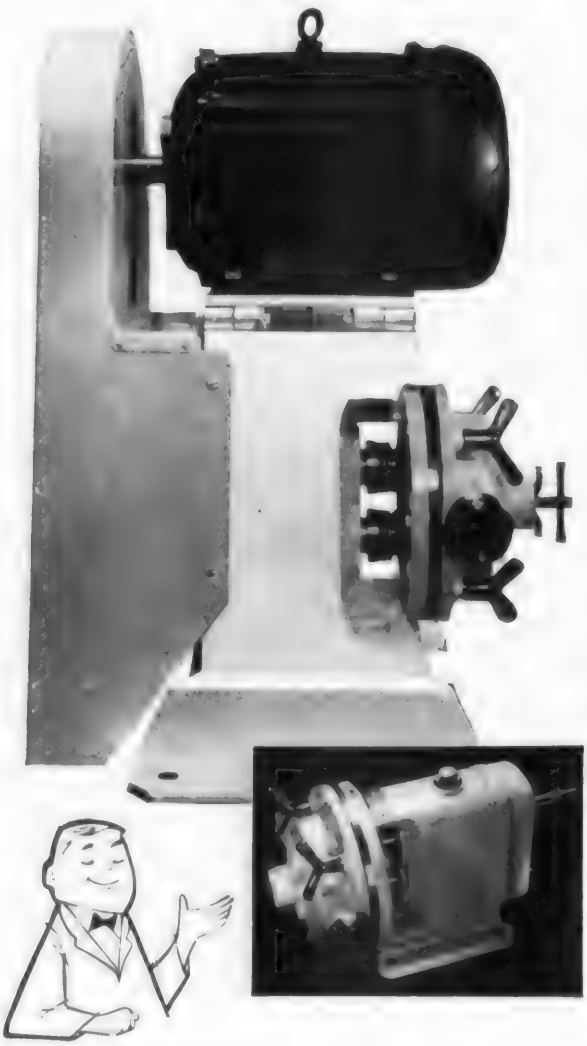
Pure Food Products get two high quality products which sell easily and profitably – Pure white fat and a premium meat product. Mr. Clarkson is a happy man – less worries – more profit.

P 26

SHARPLES

SHARPLES CENTRIFUGES LIMITED
Tower Works, Doman Road, Camberley, Surrey.
Tel: Camberley 2601 ' Grams: Superspin, Camberley.

Clean Pumping



Stainless Steel R.E.C. Pumps are of the positive displacement type, designed specifically for the clean handling of all viscous and sticky products, as well as sensitive fluids and fluids of low viscosity.

In fact R.E.C. Pumps will handle almost any product capable of being pushed through a pipe.

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Suction and discharge connections are screwed to suit customers' requirements, glands can be of the normal stuffing box type or, if preferred, Flexibox or Crane Mechanical Gland Seals can be fitted.

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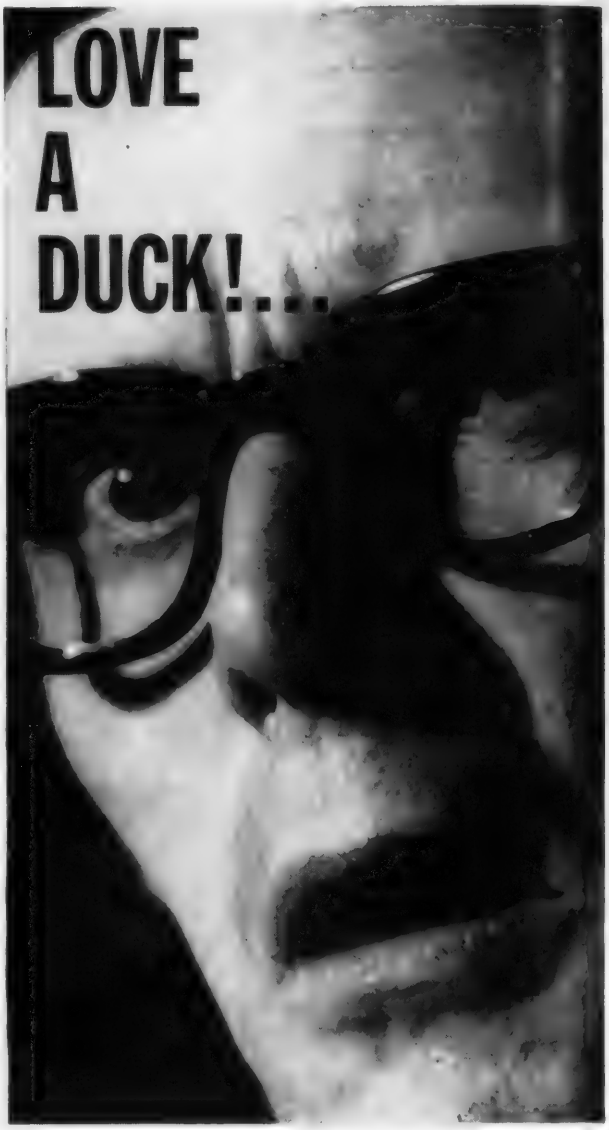

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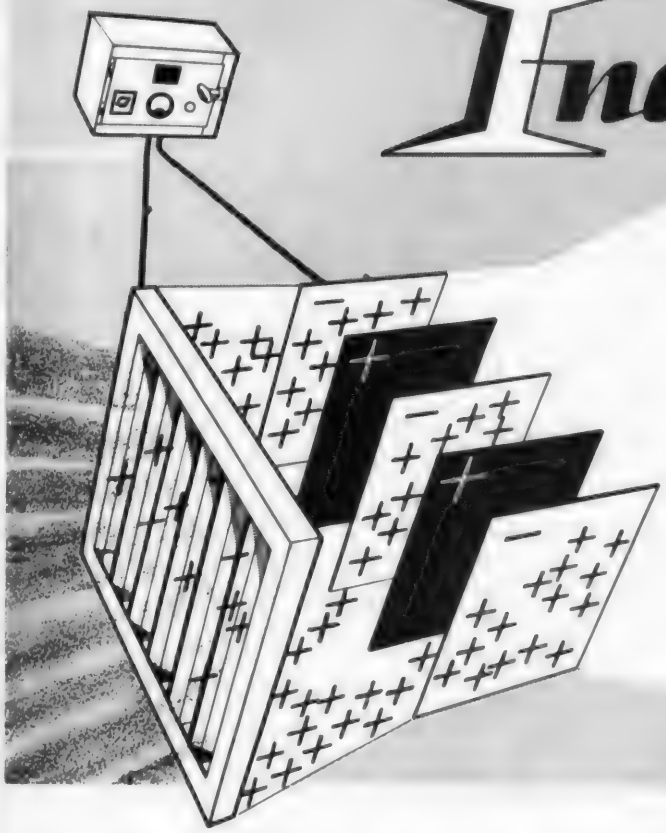

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C97

½ MILLION PEOPLE EXPECTED IN 2 WEEKS AT BRITAIN'S FOOD FAIR 1962

TAKE A STAND AT THE NEW-LOOK FOOD FAIR!

Britain's Food Fair enters its second decade in 1962. Appropriately, it will have a completely new look. Half a million people are expected to attend, but that's not the only reason why you cannot afford to miss this chance of bringing your products and your most influential customers together in perfect surroundings.

BRITAIN MORE FOOD CONSCIOUS

Nearly £5,000 million a year is spent on food and drink (excluding alcoholic drinks). This is the biggest item in the budget of Britain's homes. The trend is towards more varied, more exciting food—among the people who attend the Food Fair are the younger, the more influential, the pace-makers and trend-setters. These are your most important customers.

EXCITING THEME – 'ADVENTURES IN EATING'!

The central theme of the Exhibition—'Adventures in Eating'—has been chosen so that the special features and the exhibitors themselves can meet the constantly growing demand for knowledge about foods and how to prepare them—whether they are new products or old favourites.

INTENSIVE PUBLICITY

With the aid of continuous publicity starting from *now* the Food Fair is sure to get a firm grip on the public imagination. Then, a month before the Fair opens, a huge advertising campaign using the most powerful media will break. There'll hardly be a person in the country who will not have had his appetite whetted by the phrase 'Adventures in Eating'.

TWO TRADE DAYS

Great efforts are being made to attract home and foreign buyers and two special days (Aug. 28 and 29) have been set aside for trade visitors only.

OLYMPIA (GRAND HALL)
AUGUST 30—SEPTEMBER 12

For further information, write for prospectus to:
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FOOD
Manufacture

Volume 36. Number 9 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. September 1, 1961

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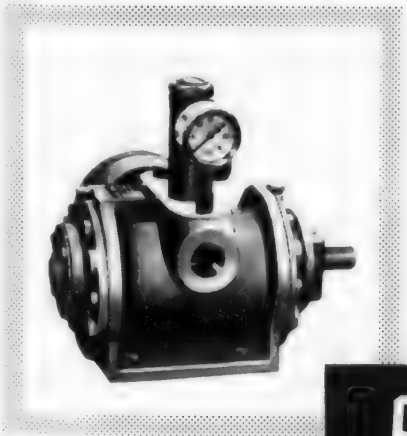
COMPLETELY OIL FREE



The new REAVELL oil free rotary compressor is based on the well known N.R.D. type compressor/exhauster. In this machine, carbon blades and sealed grease packed bearings replace the conventional fabric blades and ball-bearings. The "RN" type rotary compressor is designed to produce completely oil free air at pressures up to 15 lbs. per sq. in. As an exhauster, this machine works continuously at any vacuum up to 20 in. Hg. It is suitable for coupling to electric motors or small engines, and is also available for use with belt drive.

Oil free reciprocating compressors are also available with wet or dry cylinders for various capacities and pressures.

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MAKERS OF COMPRESSORS AND EXHAUSTERS FOR ALL INDUSTRIES

Number 37 September 1961

Glossary of Terms (cont.)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

Kirschner Value (See Bulletin number 15)

The Kirschner value is a measure of the water-soluble steam volatile fatty acids present which form water-soluble silver salts.

Lard

A fat obtained from the carcass of the pig. Unlike most vegetable fats, lard, although having a relatively high melting point, is a soft fat with a very smooth consistency.

Lecithin

Lecithin is a complex compound of glycerol containing phosphorous. It has two fatty acid radicles and a third radicle which is a complex organic base containing both phosphorous and nitrogen. It has strong emulsifying properties and is also used as a mild antioxidant.

Maize Oil (See Bulletin number 7).

Maize oil or corn oil is obtained from the germ of the maize fruit.

Marine Oil

This is a general term applied to oils obtained from fish and marine animals.

Melting Point (See Bulletin number 19)

The melting point is the temperature at which the change of state from solid to liquid occurs. With pure glycerides this is a clearly defined point, but since fats are mixtures of a number of glycerides (each having a different melting point) melting appears to occur over a wider range of temperature.

Milk Fat

The fat obtained from the milk of any mammal, but normally from the milk of the cow.

Molecular Weight

The molecular weight of a compound is the sum of the atomic weights of each of the constituent elements.

Neutralising (See Bulletin number 10)

The stage in the refining process in which all free fatty acids in crude oils are removed by alkalis.

Oleine

Oleine is the liquid portion of an oil or fatty acid mixture which has been separated either by fractionation or pressing.

Oxidative Rancidity

The development of off-flavours in an oil or fat which is caused by the action of the oxygen in the atmosphere. The oxygen attacks unsaturated linkages forming hydroperoxides which react in a similar manner to peroxides and may be estimated as such. This is the basis of the peroxide value.

Palm Kernel Oil (See Bulletin No. 4)

This is an edible oil obtained from the kernel of the palm fruit.

Palm Oil (See Bulletin No. 4)

The red oil present in the fleshy layers surrounding the kernel of the palm fruit. It differs both physically and chemically from Palm Kernel Oil.

Penetration

Penetration is one of the methods for assessing the hardness of a fat. It consists of measuring the penetration of a standard needle applied at a standard load to the surface of the fat.

Phospholipid

Phospholipid is a general term applied to compounds formed from glycerides, fatty acids and phosphoric acids. Small quantities occur in many vegetable oils and are removed during refining.

Polenske Value (See Bulletin No. 15)

The Polenske value is a measure of the water-insoluble steam volatile fatty acids present in an oil or fat.

LN 82 8058

FOOD
Manufacture

Vol. 36, No. 9 **September 1, 1961**

Is the Americanisation of our industry a bad thing?

ALTHOUGH Britain is primarily a food importing nation, a number of our food products, notably biscuits and confectionery (not to mention Scotch whisky) find a ready market overseas. The need to increase our exports requires attention to be focused on those factors of trading policy and techniques on which exports depend, a thing which the Export Council for Europe tries to do. In a recent booklet issued by the Council entitled *Trading Opportunities in Europe, Part I*, we read, for example, that much more business would be done if British manufacturers adopted the depot-stock system, that the limited demand for packed and frozen foods in Italy might increase with the spread of the supermarket system, that sales of confectionery and provisions could be increased in Austria, that British goods are hardly known in France outside Paris, that the weight and uninspired design of British packaging is a cause of universal criticism. These and other gleanings add up to the fact that exports to various countries could be improved by attention to all these points, but these are tactical considerations, not strategic, and we do not think the sum total of them amounts to very much.

What might almost be considered a strategic factor, and one which we have never seen mentioned in any publication, official or otherwise, is the growing Americanisation of our food industry. The number of British food firms being taken over by American interests is growing all the time, and the dollar investment in the British food industry is now very large. Many British firms are now owned by American industrial empires with world-wide sales networks, and the British firms are of course integrated into these networks and allocated definite markets. Purely from the point of view of marketing efficiency this may work very well, but it may not be so beneficial to the national interest.

We know of an old-established British food firm with extensive export connections in Europe who were taken over by an American group. The British firm's export markets were thereupon considerably pruned to avoid competition with the parent group's products in Europe. It so happened that the British firm benefited by an influx of American capital and by being incorporated into a very efficient organisation, but the fact remains that some British exports were liquidated.

This is happening all the time and we do not know how it affects the export position. Of course, to offset the loss in exports there is the American capital invested, but this capital is not invested for nothing, the investors expect a return, and the investments are made not to benefit the British economy but the pockets of American shareholders. We suggest to the Government that here is a matter about which some people would like to be reassured.

Food and military stomachs

THE THEME of a recent Commonwealth Defence Conference at the Royal Military College of Science, Shrivenham, "Food as a Munition of War," conjured up whimsical mental images of bombardments with rotten tomatoes and attempts to drown the enemy in the M.M.B.'s surplus milk. Shaking ourselves out of this reprehensible mood of dreamy frivolity, we pondered on Wellington's (or was it Napoleon's—or Caesar's?) dictum, "an army marches on its stomach"—(too true, if you failed to keep your backside well down it was liable to be peppered. It was also Wellington who gave the classic advice—he was speaking to a cavalry subaltern, but his words are applicable in every age and situation: "My boy, never neglect an opportunity for a p . . .").

There never has been a war which has not been decided in the last resort by the humble toiling soldier, whatever scientific aids he has had at his disposal, and the next war will be no exception. Whether it be fought on Earth or in outer space or on some other planet, the problem of supplying the fighting man with his food will remain a basic strategic factor which, if not solved, will nullify the most ingenious nuclear ironmongery.

Speed and range being the keynotes of today's military thinking, small wonder that dehydrated food

increasingly dominates modern logistics, and it may be regrettable but is undoubtedly realistic to face the fact that even if A.F.D. were to prove a commercial flop (and we cannot think that it will) it will continue to be developed for purely military reasons alone.

"Unfit for human consumption"

THESE are harsh words, and call up a picture of food that is putrid or crawling. Unfortunately the legal interpretation of the phrase is elastic. Sometimes the presence of a foreign body is held to render the food unfit for consumption. Magistrates have at various times exonerated pieces of metal or string, but have condemned food containing fragments of tobacco.

A recent High Court appeal, recorded in *The Times*, concerned incipient mould growth on meat pie. The defendants claimed that since no danger to health was involved a prosecution—if any—should have been brought not under Section 8 of the Foods and Drugs Act, but under the milder Section 2 which concerned material " not of the substance or quality demanded."

The Lord Chief Justice, in dismissing the appeal, said that he was not prepared to say that in every prosecution under Section 8 it must be proved that the food was injurious to health. It was a matter of degree in every case. The present instance was clearly a borderline one, and by imposing only a nominal fine the justices indicated that they did not consider it serious.

Canned foods and cancer

SURELY canned foods have been with the human race long enough for any hazards associated with their consumption to have been fully explored. Many people enjoying a ripe old age have eaten canned foods all their lives, yet now we have Lady Summerskill, who from her medical training should know better, insinuating in the House of Lords that canned foods cause cancer. The only evidence she adduced was that a small community of nuns in Africa whose diet consisted mainly of canned foods had a high mortality rate from cancer.

This is an excellent example of how people throw scientific principles to the winds when they have bees in their bonnets. Lady Summerskill must know that important deductions should not be made without investigations based on scientific principles. Firstly, the number of nuns seems much too small in relation to the number of people who eat canned food for any reliable deduction to be made. Secondly, no comparison seems to have been made with a control community, so that statements about an isolated community of nuns mean precisely nothing. Thirdly, Lady Summerskill gives no indication of the nuns' mode of life or from what kinds of cancer they suffered. If, as was likely, they were medical missionaries, it would be just as logical to ascribe the cancer to some therapeutic which they habitually handled, or to some other factor in their mode of life. Fourthly, Lady Summerskill does not give any figures to show that the nuns' cancer rate was indeed any higher than that of any other community.

It would be pardonable to infer that Lady Summerskill was prejudiced against canned foods, but that surely would be unscientific.

Who will write a history?

THE ADDRESS of the retiring chairman of the Food Group, Mr. Thomas McLachlan, which surveyed some milestones in the history of food technology, should inspire someone to write a book on the subject. As Mr. McLachlan said, the improvement and consolidation of food processing is causing many very ingenious pieces of plant and many processes of development to pass rapidly from the scene. He expressed the hope that many of these would be placed on record in their proper historical position before it was too late, and before they were forgotten.

It was unfortunate that the Food Group's annual general meeting clashed with the opening of the Irish Sugar Company's A.F.D. plant at Mallow, and our attendance at the latter function prevented us hearing Mr. McLachlan's address in person. But we have read the script of his address and believe that, subdivided as it was into sections dealing with the various aspects of food technology—preservation, dehydration, bottling and canning, and the rest—it could well form the basis of a comprehensive and fascinating treatise which would fill a gap in the literature of food processing.

The recent pure food and canning celebrations have awakened interest in the subject and many facts formerly buried in the dusts of time have been brought to light, including actual examples of historic food packs not previously known to exist. We are sure that up and down the country there are in factory vaults and scrapheaps many interesting machines of long ago that could be photographed and thus recorded for posterity before they are sold to the scrap merchant. Some of these old machines were still in use until very recently, which testifies to the robustness of their construction and their advanced design when they were built.

The story of food processing is a fascinating one,

and of all the technologies is the one with the most human appeal. The discovery of winemaking and brewing over 6,000 years ago, the development of preservation methods from primitive sun drying and salting, the influence of the discoveries of Pasteur and others, the discovery of vitamins, the story of margarine, the profound effect of refrigeration—these and many other aspects are worthy of historical research, the fruits of which should be recorded by a talented scribe.

Local authorities say "no" to date marking

THE HEALTH committee of the Association of Municipal Corporations, which represents borough councils throughout the country, has decided to take no action on suggestions that legislation should be introduced requiring prepacked foods to be dated, or alternatively marked with a code number. The committee say that although they acknowledge that a limited number of foods are sufficiently stable to be marked in this way, they are reluctant to recommend legislation which would inevitably be very limited in scope, involve much administrative work, and be of doubtful advantage.

In this decision the committee are only coming round to the conclusions arrived at by all those who delve into this matter. Food deterioration occurs at a very variable and sometimes rapid rate which is accelerated by bad storage conditions. Date stamping might well create a false sense of security and discourage the taking of necessary precautions. The committee point out that a date-marking requirement might actually hamper local authorities in the enforcement of their present powers should it be used as a defence in court against a prosecution brought by a local authority.

The committee makes the further sensible point that more good is likely to be achieved by the voluntary extension of date marking in cases where it is of advantage to the trade and to the consumer.

Is this how the Russians live?

THERE was surprisingly little reference to the Soviet Union's food processing industry at the recent Soviet Exhibition in London. A display of canned food, smoked meat products and confectionery, some agricultural machinery and a model of a mechanised piggery for fattening 10,000 pigs at a time were the only exhibits of direct food interest on view. The standard of the confectionery packs was poor and the designs of the can labels very dull. A high proportion of the cans seemed to be of aluminium.

The exhibition as a whole was a disappointment. The inevitable communist clichés and busts of Lenin were to be expected, but as a presentation of everyday life in the U.S.S.R. the exhibition was badly labelled. The large array of very diverse examples of Russian industry and crafts could have been presented in much more dynamic fashion. In spite of her technological advances, the drabness still popularly associated with Russia seemed to show through.

The centrepiece of the show, the gloomy cavern of cosmology, endeavoured to make the most of Russia's space achievements without revealing any information of the slightest value or interest, two irreconcilable aims. The result was that this section of the exhibition, which could have been the most interesting, was merely a mixture of corn and ham, and we do not mean the edible varieties. If the food processing industry gets as much proportionate attention in the U.S.S.R. as it did in the exhibition, Soviet citizens must eat extremely poorly.

Potatoes and bread are valuable foods

A RECENT letter from Dr. J. G. Davis in *The Lancet* (July 15, p. 158) brings a breath of fresh air into the diet and health controversy. It gives some interesting figures about the percentage contribution to the diet of certain foods and shows that the value of bread and potatoes is greater than is generally realised. Potatoes are an excellent source of vitamins with the exception of A and D, contributing no less than an average of 34% of a person's total requirements of vitamin C, for example. Bread is easily the cheapest source of many essential nutrients, contributing 20% of a person's protein, 18% of calcium, 21·5% of iron, 24% of vitamin B_1, and 23% of nicotinic acid.

"Bread and milk," the letter states, "are indisputably our two most important foods. The average intake of these two alone provides 29% of our energy, 39% of our protein, 66% of our calcium, 25% of our iron, 36% of our vitamin B_1, 42% of our riboflavine, and 27% of our nicotinic acid requirements at a cost of only 4s. 9d. per week." The only substantial contribution by fruit and vegetables is vitamin C and to a lesser extent vitamin A.

Much misleading information and advice is tendered to overweight people and those who are scared of coronary disease, such as injunctions to cut out bread and potatoes. In actual fact, an overweight person should cut down on sugar, sugary foods and fats. Those who, heeding popular opinion on the dangers of milk, butter, cheese, eggs, bread and potatoes, drastically reduce their consumption of these foods or eliminate them altogether, could easily upset their dietary balance and lack essential calcium, riboflavine, vitamins A, B_1 and C and nicotinic acid.

"If fat intake is to be reduced," says the letter, "[milk, butter, cheese, eggs, potatoes and bread] provide 45% of our energy and from 34 to 80% of the most important essential constituents of our diet, while responsible for only 41% of our fat intake; they cost only 9s., or less than a third of the average expenditure of 30s. per week on food. If the quantities of bread and potatoes are doubled the result is an almost complete diet for only 12s. per week; and all these foods can conveniently be bought in small units."

Dr. Davis points out that there are many striking inconsistencies in attempted correlations between coronary disease and the quantity and nature of the fats consumed, and concludes his letter with the following commonsense advice: avoid extremes; eat a reasonable amount of a well-mixed diet with a little more emphasis on fresh fruit and green vegetables and less emphasis on sugar and meat fats; if overweight, reduce by eating less, particularly reducing sugar and meat fats; take an hour's brisk walk daily; and have a hobby. He also advises: "If a smoker, smoke a pipe," but our opinion, for what it is worth, is that one is healthier for cutting out smoking altogether.

More science is wanted in the fish industry

THE INSTALLATION in one of the Grimsby factories of the Ross Group of what is claimed to be the first production dielectric fish defrosting unit in the world marks a new stage in improving the quality of the fish consumed in Britain. When we were in Norway recently we remarked on the much better quality of cooked fish there compared with the stale slabs of albino chipboard which pass for cod fillets in this country. The reason for the difference, of course, was that the Norwegian fish was fresh, whereas fish eaten in the cities of Britain has been lying in the hold of a trawler for anything up to three weeks or a month, inadequately chilled with ice, left lying in the sun on the quayside possibly for a whole day, and consigned to the doubtfully tender mercies of British Railways before it reaches the retailer. No wonder by this time what is left of the fish is decidedly the worse for wear.

(We do not know how true is the story of the diner in a Grimsby hotel who was told that fish was off the menu because the consignment from Billingsgate had not yet arrived, but we can well believe it.)

Signs that all this is changing are evident. The day must come when all the fish brought to these shores from distant fishing grounds will have been processed in factory trawlers and deep frozen at sea. Already a number of these factory trawlers are operating, and fishing interests will have to change to the new methods or go out of business. It is a wicked waste of Nature's gifts not to apply the fruits of technology to fish preservation in these days when food production is urgent as never before, and when it is becoming increasingly realised that the sea holds vast resources of food which are virtually untapped.

The fish industry is notorious for backwardness, conservatism and refusal to apply the fruits of modern research. Isolated establishments like the Torry Research Station and a few enlightened large firms are bringing some science into the business, and the sooner the rest of the industry follows suit the better, both for its own sake and that of the consumer.

Pet foods for humans?

A RECENT article in the *Financial Times* highlighting the big increase in canned pet foods during the last four years evoked some amusing stories about Irish labourers in Liverpool who ate canned pet food in their sandwiches, negroes who ate it for dinner and a Chinese restaurant which served it regularly to its customers, but as a letter in a subsequent issue pointed out, these stories do not bear investigation and serve merely to illustrate people's credulity.

Having seen how pet foods are made, however, we do not doubt that if humans did eat them they would not come to much harm, for canneries devoted to their manufacture are run on much the same hygienic lines as are canneries devoted to human food. It is doubtful, however, if pet foods would taste very nice to humans, yet our four-legged friends seem to find them attractive enough, to judge by the increasing consumption. One interesting point arising from the correspondence quoted above is the assertion that Petfoods, Ltd., is the Metal Box Co.'s largest single customer.

Our packaging supplement

NOTHING in this life should be taken for granted. Because this journal has never before produced an editorial supplement following the advertising pages at the end of an issue does not mean that such a thing cannot happen, and this month readers are advised, if they have not already found out for themselves, that right at the end of this issue there is to be found a 32-page supplement devoted to the perennial topic of packaging. Some thoughts are offered on new labelling developments, colour in packaging, machines for packaging A.F.D. foods, and other aspects of packaging, as well as descriptions of some of the new materials and machines currently in the news.

A general view of the new dextrose crystalliser house at Brown and Polson's Manchester factory.

Brown and Polson's New Corn-Sweeteners Plant

Dextrose output quadrupled

Our issue for April, 1960, described in detail Brown and Polson's factory at Trafford Park, Manchester, for the wet-milling of maize and the manufacture of high-purity starch and starch derivatives, including glucose, dextrose and other products of starch hydrolysis. The first section of the factory went on stream five years ago, and since then further new sections have been added; the latest is the new dextrose house which has quadrupled dextrose production and uses a new process which gives a better product and makes possible the manufacture of high-conversion liquid glucose.

FOR many years the dextrose monohydrate manufactured by Brown and Polson, Ltd., and marketed under the trade name *Cerelose* has met the specification laid down in the British Pharmacopoeia. With the opening of a new plant for the production of this material, using a new process, the dextrose is of even superior quality. After the war, an extensive rebuilding programme was launched by the company, and five years ago the first new section of the factory at Trafford Park, Manchester, was opened. Since then further new sections—including the largest "corn grind" (wet milling of maize) operation in Europe—have been added from time to time; the latest is the new dextrose house which is the subject of this article.

This new plant produces four times as much dextrose as before; it also makes possible the manu-

facture of high conversion liquid glucose.

The firm say that in the short time the plant has been in full operation, production costs are already markedly less. These cost reductions have been passed on to the customer by lower prices effective since June, and the firm say that the present price of *Cerelose* is the lowest ever in the U.K. for dextrose monohydrate.

Food uses of dextrose

Dextrose is a natural sugar found in many plants. It is a mono-saccharide, and one of the two constituent mono-saccharides produced by hydrolysis of sucrose.

The main reason for its use in food manufacture is that it crystallises more slowly, and in smaller and softer crystals, than sucrose. To some extent it controls sucrose crystallisation when both sugars are present. In addition it is less sweet than sucrose, and therefore, by balancing the two, both the solids and sweetness level can be controlled.

Other assets of dextrose as a constituent of food products are: it is very readily water soluble; it has humectant properties; and when heated with nitrogenous substances, it gives a brown colour and slight caramel-like flavour to products containing it.

Many applications of dextrose monohydrate are well established. It is used in biscuits to give good colour, and in biscuit creams for texture and flavour. It is used in soft ice cream to improve texture and consistency. In ice lollies it prevents the warts which appear on the sides of lollies made with sugar only, and then kept in store for long periods. Dextrose is being added to many soft drinks because it improves flavour, and particularly it can be used as the glucose source when a soft drinks label contains the words "with added glucose."

In fondant and fudges it improves texture, while it is added to a host of other sugar confections to control the sweetness and improve shelf life. A more recent application of dextrose is in the wine trade where this sweetener is used as a source of fermentable sugars, and also to give residual sweetness to the wine.

Dextrose is used in American-type bread to give the particular combination of sweetness, richness, and moistness desirable in that product. In curing brines it is reputed to give a brighter and better "lean" which gives good colour, flavour, etc., to bacon and hams.

Dextrose crystals are freed from mother liquors in this row of semi-automatic cycling basket centrifuges.

High conversion liquid glucose

In addition to dextrose monohydrate the new plant is making a high conversion liquid glucose of approximately 63% dextrose equivalent (the reducing sugar content expressed as dextrose on a dry solids basis and hereafter referred to as D.E.). The high conversion liquid glucose produced by Brown and Polson is marketed under the trade name *Rex*.

High conversion liquid glucose has a number of applications which cannot be met by the standard acid grades. In biscuit manufacture it is more suitable than ordinary liquid glucose because it is able to give better colour and extended shelf life to a whole range of products. The humectant properties of high conversion syrup are particularly valuable in flour confectionery, while general texture and flavour improvement are noticed in products made with it. High conversion glucose can be used in a similar way to dextrose for soft ice cream. A particularly big outlet is in jam making where up to 25% of the sugar can be replaced, with a consequent saving in raw material costs.

Sugar confectioners particularly benefit from the high conversion liquid glucose, because it is the material most suitable for high moisture content confections, such as marshmallow, nougat, jelly products and cream paste in liquorice allsorts. The syrup of canned fruits containing high conversion liquid glucose is more viscous, and the general quality of fruits is improved.

THE NEW PLANT

The raw material for both dextrose and liquid glucose is pure starch, a material made at the factory directly from raw shelled maize.

For a description of the wet-milling of maize and the preparation of pure starch the reader is referred to FOOD MANUFACTURE, April 1960, p. 137. Briefly, the process is as follows:

Ships containing up to 10,000 tons of maize sail up the Manchester Ship Canal to the Brown and Polson private wharf on site. Pneumatic devices unload the cargo and transfer it directly to silos.

As required the maize is drawn from the silos, thoroughly cleaned, and sent for steeping, a most important part of the wet-milling process.

In the steeping operation a warm solution of sulphur dioxide is circulated over the maize continually until it is thoroughly softened and conditioned ready for milling. A two-stage grinding operation then takes place.

In the first grinding a simple maceration releases the germ of the kernel and allows it to be floated away in germ separation tanks. The remainder of the kernel goes forward for a more thorough grinding to separate the fibre, gluten and starch.

Sieving in high speed rotary screens removes the fibre from the starch-gluten mixture. This goes forward again for final separation by centrifugation. A series of hydroclones purify the starch until it is of the highest possible commercial purity. This is the basic material for the new plant's products.

Bagging off pure dextrose on a semi-automatic filling and weighing unit.

Conversion to sugars

If a slurry of starch is completely hydrolysed, the ultimate product is dextrose, because this sugar is the basic building block of the starch polymer. When dextrose monohydrate is being produced, a starch slurry is hydrolysed as far as possible to the dextrose stage.

If the hydrolysis is taken only part way then the resulting product contains a number of higher and lower saccharides. Such a mixture is liquid glucose. By conversion to required reducing sugar content a number of different liquid glucose grades can be manufactured. *Rex* liquid glucose has a dextrose equivalent of 63%. Differential analysis shows that it contains approximately 41% dextrose, 29% maltose and 30% higher saccharides on a dry solids basis.

Manufacture of dextrose

A slurry of starch at carefully controlled concentration is converted, that is, hydrolysed, until the reducing sugars show that a D.E. of approximately 95% has been reached. Liquor leaving the converter is at a relatively low solids concentration and contains impurities.

In the first stages of refining, the converted liquor is filtered through a rotary precoat vacuum filter to remove protein. The filtrate goes into the excise tanks where the volume is measured so that Excise duty can be evaluated.

The main removal of impurities and colour bodies is effected by means of activated carbon. A series of operations take place in which the liquor from the excise tanks passes through rotary Vallez filters which have carbon on their

leaves from a previous batch. Partially purified liquor is concentrated in a triple-effect vacuum evaporator to a given specific gravity and then mixed with fresh activated carbon. After a given contact time, the carbon is stripped away on clean Vallez filters and the carbon left on the leaves is used for the first processing stage on the following batch.

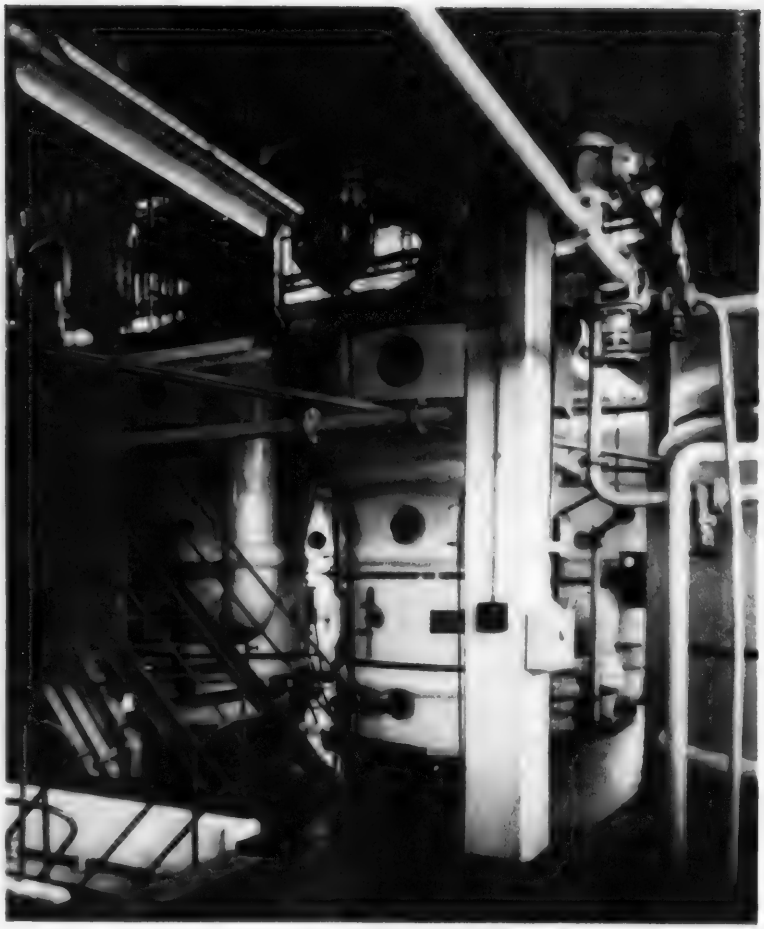
Thus a counter-current carbon treatment is used in which the partially purified liquor is finished off with fresh carbon, and the original liquor is partially purified with "once-used" carbon.

Purified liquor at the desired D.E. is adjusted to a given concentration and temperature before passing to pre-crystallisation tanks. As required this liquor is taken into the crystallisers, which are large horizontal tanks fitted with slow moving agitators and cooling coils. Over a period of 6-8 days the liquor is carefully cooled, a percentage of an earlier batch of crystals left in the crystallisers acting as seed for the new batch.

By correct cooling, a process learnt by long experience, dextrose crystals of the desired size and shape are formed. When the crystallisation has reached the required limits the slurry of crystals and liquor goes to semi-automatic basket-type centrifuges which spin off the liquor, leaving pure white dextrose crystals in the basket.

Having been ploughed out of the centrifuges, the dextrose crystals are carried by conveying devices into a hot air drum dryer. Dextrose crystals run through the drum counter-current to a stream of clean, heated air.

At the end of the dryer, crystals are collected in a cyclone, are screened, and drop into the hopper of an automatic weighing and bagging device. The dextrose is packed in multiwall paper sacks fitted with a patent sleeve filling. The packing machine operator simply fits a fresh bag to the device; at a signal he removes the filled bags at correct weight and reverses the sleeve, thus sealing the bag. From this point the dextrose goes into store for ultimate despatch.



Triple effect evaporators used for concentrating high conversion liquid glucose.

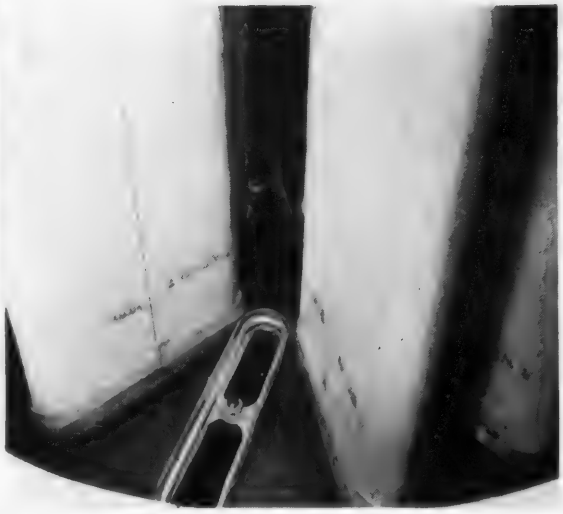
Manufacture of high conversion glucose

In some ways the manufacture of high conversion glucose is similar to the production of dextrose. In the first stages a slurry of starch at controlled concentrations is converted by the acid process to a predetermined dextrose equivalent. The liquor from the acid converters is neutralised and passed to the excise tanks for volume measurements.

Subsequently the liquor is given a first treatment with activated carbon and passed to triple-effect evaporators for evaporation. At this point the partially refined liquor goes to other converters for further processing. These converters are large tanks in which for a period of hours the temperature and *p*H are carefully controlled. When the D.E. has reached 63 the liquor is drained off, given a second carbon treatment and then sent to the finishing pans for concentration to the specific gravity at which it is despatched.

Particular care has been taken with the design and layout of plant and the colouring of the buildings and equipment to give most efficient and yet congenial working areas. As can be seen from the photographs, a modern colour scheme has been adopted on the advice of industrial colour consultants.

The accent throughout is on quality control. Specific sampling programmes have been drawn up to ensure the highest quality of product. As is common in factories of this type, no product is allowed to leave the warehouse until it has received full clearance from the control laboratories.



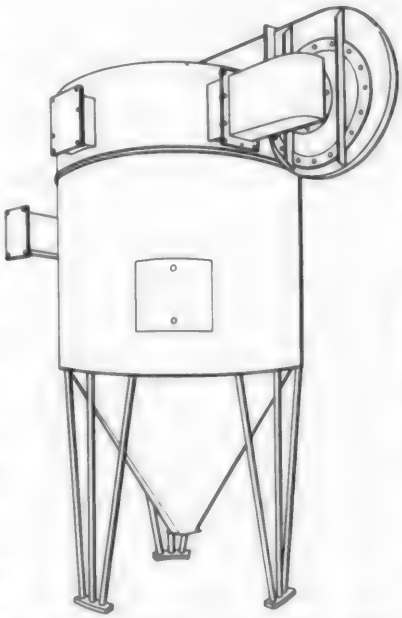
(*Left*): **Interior view of the upper chamber of the Simon RJ Filter showing the rotary arm which provides the high velocity reverse jet action for the efficient cleaning.** (*Right*): **The lower section of the RJ Filter. Note the large cloth area of the filter units fitted in the compact machine.**

A New Dust Collector for Millers

THE Simon Reverse Jet Pressure Filter was originally developed in North America to control dust in various industries including feed, flour, grain, powdered milk, salt, starch and sugar. Having been rigorously tested under all kinds of operating conditions, it has proved itself so efficient, say the makers, Henry Simon, Ltd., that it is now offered to flour millers as an alternative to the Simon Reform Filter.

The Reverse Jet Pressure Filter is extremely simple in design, having only three moving parts. It consists of a cylinder into which the dusty air is blown tangentially. The heavier particles drop into the hopper by the expansion and cyclonic behaviour of the air. The air then passes through the felt filters from the outside of the sleeves, leaving behind the finer dust particles, and is sufficiently clean to be returned directly into the plant. The felt filters are kept clean by a rotating arm which blasts air into each filter chamber in turn from the top of the cylinder.

Henry Simon, Ltd., are providing two models of the filter with cloth areas of 260 and 320 sq. ft.

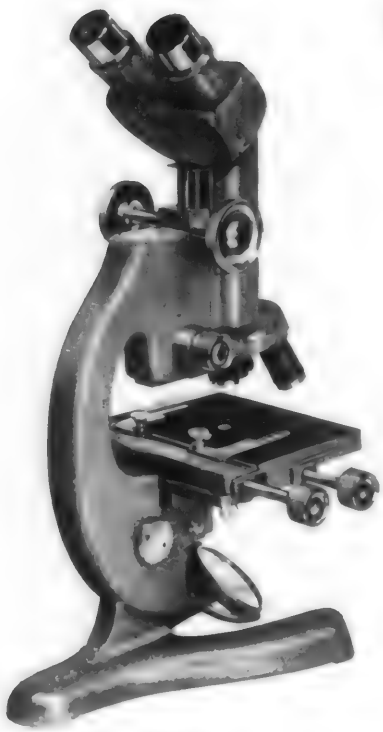


The Simon Reverse Jet Pressure Filter, a new dust collecting appliance claimed to have practically 100% dust filtering efficiency.

or multiples of these units. The machines will run continuously with little maintenance and practically 100% dust filtering efficiency.

The advantages claimed for the machine are the increased efficiency in terms of air to cloth loading, the smooth air flow of the exhaust system at all times, a reduction in operating horsepower when used in pneumatic systems, savings in maintenance and space requirements over earlier types of Suction Filter Dust Collectors and a saving in installation costs.

The filter sleeves maintain their shape when stretched over these frames. The photograph also illustrates the arrangements of the large filter area in the low chamber.



A typical binocular microscope of the kind used in food laboratories.

Microscopy for the Food Technologist

Sections and Section Cutting—1

By S. M. Charlett, F.R.M.S.

As pointed out in previous articles on Microscopy by the author, much information is published on the microscopical appearance of food but comparatively little on microscopic technique. This article gives practical advice on the important technique of cutting sections by hand and by means of hand-operated and automatic microtomes.

IN earlier articles dealing with some of the basic forms of microscopical technique as applied to the examination of materials of interest to the food technologist (see FOOD MANUFACTURE, March 1956, p. 114, and May 1956, p. 198), the terms *Section* and *Section Cutting* have frequently occurred. It was noted at these times that the subject of sections was too wide to deal with there and then and that it was hoped at a future date to give an outline of the meaning of these terms, and to give brief notes on the techniques which are involved.

It is hoped that the description and notes given in this article will be of some interest and use to those who have not dealt with the subject of Section Cutting, or dealt with sections in any form.

The techniques to be described apply to animal and vegetable specimens; the examination of such materials as fibres, metals, etc., is rather more specialised and cannot be discussed in detail here.

DEFINITIONS

Before we proceed to discuss the techniques employed for the preparation of sections it may be of interest and value to consider some of the terms which will be employed in this article. This will avoid tedious repetition and confusion later on.

1. Section

Frequently when it is desired to examine specimens by means of the microscope it is found that the specimen is too thick. In such cases a great advantage is gained by the cutting of very thin slices of the specimen which permit the passage of light, and allow the microscope to be focused on definite parts which are to be examined. Such slices may be roughly cut with a sharp knife or scalpel, much thinner slices can be cut using a razor or a special type of knife known as a *microtome*. Whichever technique is employed, the ultimate slices are known as *sections*. This term has several sub-terms, but here we will consider only the two main types of section that the technologist is likely to need.

If we take a vegetable or any other specimen which is long and thin, and from this we cut our thin slices or sections at right angles to the long axis of the specimen we produce *cross* or *transverse sections*.

If on the other hand we cut our sections parallel to the long axis of the specimen, we produce *longitudinal sections*.

If the sections, whether they are transverse or longitudinal, be kept separate and are arranged in the order of cutting they are known as *serial sections*. Under certain conditions of preparation, and by a special method of cutting, both of which will be discussed later, it is possible to cut serial sections in such a way as to allow them to remain connected to form a *ribbon*. The value of serial and ribbon sections will be discussed later.

2. Section Cutting

From the above paragraph it will be obvious that this term defines the act of preparing sections. By the professional microscopist, however, the term *sectioning* is more generally used. There have been many ways devised for the cutting of sections, but in general these may all be classified under three main headings:

(1) free-hand sectioning;
(2) hand microtome sectioning;
(3) automatic or semi-automatic microtome sectioning.

3. Microtome

This is an instrument by means of which it is possible to cut very thin slices or sections quickly, and much more accurately than could be done by hand alone. It may consist of a very simple hand-operated instrument, or it may be a fairly complex piece of automatic equipment in which the thickness of the section is accurately controlled.

TECHNIQUES

1. Free hand sectioning

As the term implies, this technique involves the cutting of sections without the aid of any mechanical apparatus. The only tool used is a razor. Opinions vary as to the type of razor which will give the best results, some workers advocating a special plano-concave razor (i.e. one side flat, one side concave), others suggest a double plano (i.e. with both sides flat), but the writer has found that the old-fashioned type of ordinary double concave or "cut-throat" razor will give perfectly satisfactory sections if used carefully. The secret of obtaining good results with any type lies in constant practice of the technique to be described.

The razor should be shaving sharp, and freshly stropped; a few notes on the care and sharpening of razors are appended at the end of this article. Besides the razor it is useful to have a few pieces of elder pith or carrot which have been steeped in 70% alcohol for several days; the object of these will be clarified below.

A piece of the specimen about 1½-2 in. long is prepared. If the specimen is large and thick it should preferably be shaped to about ¼ in. square for convenience. This is held in the left hand between the index finger and thumb, as one might hold a pencil, for example, and the remaining fingers are used to steady the specimen. The end from which sections are to be cut is allowed to protrude just above the fingers.

The razor is now held in the right hand as if about to be used for shaving and allowed to rest along the upper surface of the index finger, the edge just touching the specimen to be sectioned. The razor is then gently sliced through the specimen to cut the first section.

The thickness must be judged by the eye, but it is essential that the cutting stroke be continuous; any hesitation or change in the stroke will ruin the section.

The first cut is usually rejected as too thick or irregular. A second cut may be taken by resting the razor along the finger, as described above, and then pressing down very gently before cutting; the flesh of the finger will act as a spring and allow very thin cuts to be taken, depending on the amount of downward pressure employed. This procedure may be repeated until it is not possible to cut any lower down the specimen without danger to the fingers. At this stage the specimen may be adjusted upwards a little and further cutting performed until the specimen is too short to be safely held in the fingers. Care should be taken not to slice the side of the left thumb.

During all section cutting operations the razor should be freely lubricated with 50% alcohol, using a small camel-hair brush. Sections may be transferred to a watch glass containing alcohol of the same strength, using the same brush, either as they are cut or after a few have accumulated on the razor, but it is essential that they are never allowed to become dry. When the required number of sections have been cut the operator may treat them by one of the methods described in earlier articles, or one of those mentioned later in this article, in order to prepare them for microscopical examination.

Free hand sectioning is generally employed for the rapid examination of specimens, and will only be found useful for a general examination. The hand section is rarely less than 75 microns thick and only allows the grosser details of structure to be investigated. The technique is usually employed for vegetable materials, and only upon occasion for specimens of animal origin. The reason for this is that most vegetable structures are fairly rigid, whereas animal tissues are usually flaccid. The former allow the cutting of thin sections without the need for some sort of support for the tissue being cut, the latter need a supporting agent to allow the thin sectioning of materials.

It is possible to provide support to some of the flaccid specimens by surrounding with tissue of a firmer type, and this is where the elder pith and carrot are used. These

An automatic microtome. (*Both photos by courtesy R. & J. Beck, Ltd.*)

should be stored in 70% alcohol for some time prior to use. The technique with these is to take a piece of pith or carrot and split it lengthwise with a scalpel. The split faces are then slightly hollowed out to provide a seat for the specimen to be sectioned, in such a way that the specimen is gripped gently but firmly. Sections may then be cut in the normal manner, and those of the specimen separated from those of the supporting material.

Hand sections may be examined directly under the microscope by placing on a clean slide together with a drop of distilled water, then covering with a cover glass and examining under the required magnification. This will usually suffice for a rough examination, but it is best to use one of the suggested techniques for the differentiation of structures if the most information is to be obtained from any specimen.

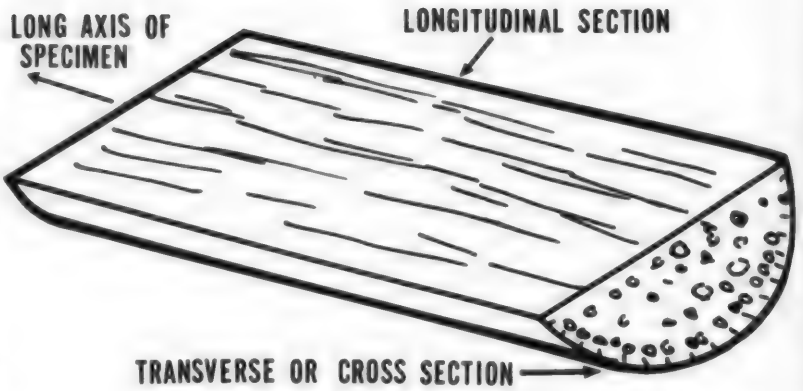


Diagram showing the basic types of section.

2. *Hand microtome sectioning*

The use of a hand microtome enables the worker to cut somewhat thinner and, what is really more important, more regular sections. The thickness of sections can be controlled to a far greater degree than is possible by hand, and one can rely on a reasonable set of serial sections if they are required.

Essentially the hand microtome consists of a steel or brass cylinder about 4 or 5 in. long and $\frac{3}{4}$ in. in inner diameter. At one end the opening cylinder is surrounded by a flat table about 3 in. in diameter, machined flush with the end of the cylinder. At the opposite end the instrument is fitted with a bush holding a threaded rod which can be rotated by means of a knurled knob. The threaded rod moves a platform up or down within the body of the microtome.

The technique of using the microtome is quite simple. The specimen to be sectioned is placed inside the cylinder, resting upon the movable platform. It is packed firmly in place either by shaping carrot or pith to fit the cylinder, or by filling the body of the cylinder with some fairly cool, melted paraffin wax which is then solidified by plunging into cold water.

In either case the method of cutting is the same. The inner platform is screwed upwards until the specimen just protrudes above the edge of the cylinder, then the microtome is held in the left hand which is steadied by resting against a bench or table. The razor is placed on the table of the instrument so that it is perfectly flat with the edge just touching the packing now protruding from the central hole. The excess packing and specimen are now sliced off by sliding the razor across the table surface, and these are discarded. The specimen is then adjusted upwards by means of the knurled knob and the first section is then cut by again holding the razor flat on the table surface and then sliding across.

As in free hand sectioning, the razor stroke should be unhesitant and complete if a good section is to be produced. Further sections may then be cut by repeating the above procedure, until the required number have been obtained. Once again the razor should be continuously moistened with 50% alcohol during cutting, and sections may be transferred to alcohol as cut, or when several have accumulated on the razor.

The thickness of sections cut by this technique is obviously governed by the movement of the screw thread which operates the platform of the microtome. Most of the better types of instrument carry some form of graduated scale which enables the operator to ascertain quite accurately the amount the table is raised when the screw is adjusted. In other types of hand microtome, however, no graduated scale is provided and it is left to the operator to work out the relative movement of the platform by relating the number of turns or fractions of a turn of the screw with the number of threads to the inch. Movements of between 15 and 25 microns can be obtained fairly accurately.

The hand microtome may be used for both vegetable and animal tissues, because the specimens may be packed to give support during cutting, although it is best that animal tissue be prepared as described under the following section.

3. *Sectioning with the automatic microtome*

The use of the automatic microtome for routine section cutting is rapidly spreading. The automatic microtome allows the cutting of sections of the utmost thinness, with obvious advantages. The biggest difficulty seems to lie in the apparently complicated preparation of specimens. This preliminary treatment is not as complicated as it appears at first sight, and the amateur can produce good sections if care is taken to follow the standard procedures.

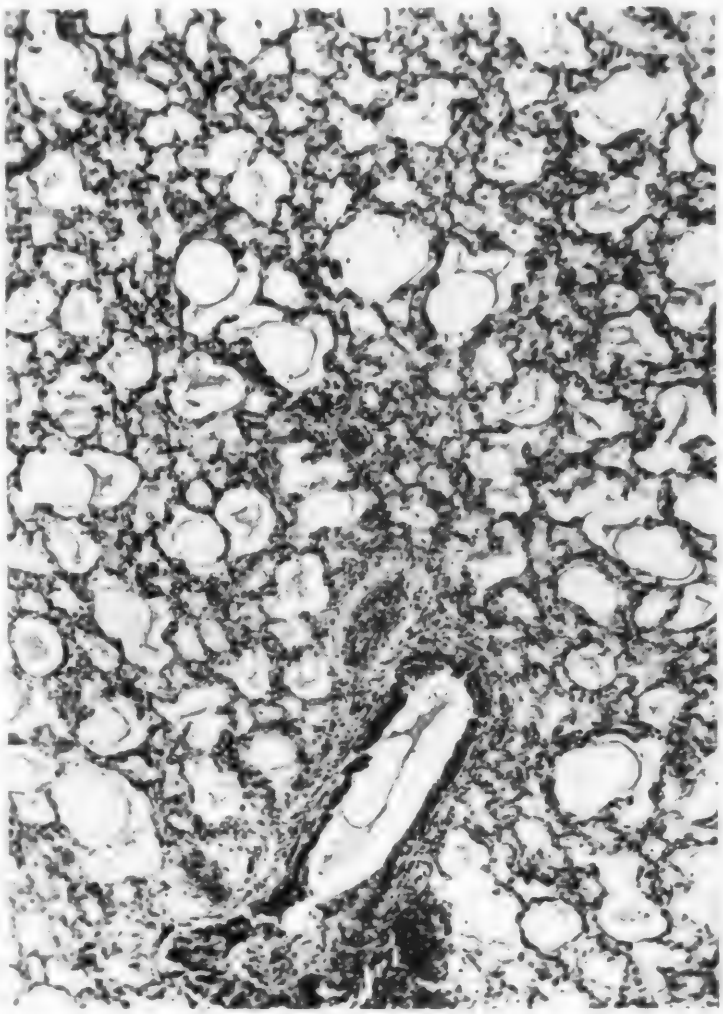
The instrument itself is really semi-automatic for, with the exception of certain very specialised microtomes such as those used to prepare sections which are only fractions of microns in thickness for examination by the electron microscope, the actual cutting operation is performed by manual operation of controls whilst the adjustment of the specimen to allow sections of preselected thickness to be cut is fully automatic and is made by preset controls of great accuracy.

There are many forms of the automatic microtome in use at present and there is not room here to deal with all the types. One of the most widely used is the rocking microtome. Originally designed in 1885 by the eminent scientist Sir Horace Darwin, this has remained virtually unchanged in its basic design, although various improvements have been made in the interests of accuracy. It will cut sections with thicknesses adjustable between 2 and 24 microns.

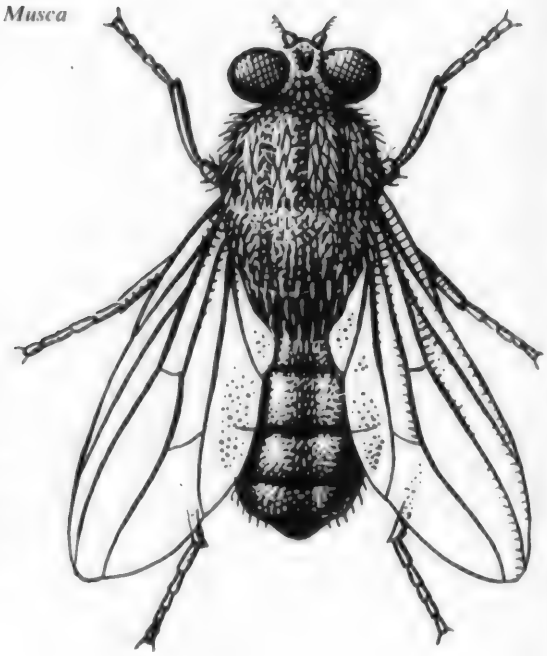
Essentially it consists of an arm pivoted on special steel knife edges so that it may be rocked up and down, hence the name. At one end the arm bears a specimen carrier to which the specimen to be sectioned is attached. The carrier has an up and down movement of some two in. along a curve of very large radius, the effect being that the carrier moves in an almost straight line. The rocker arm is actuated by means of a simple manually operated cord-driven mechanism. By means of a very accurate ratchet mechanism the rocker arm also moves a preselected distance towards a cutting edge mounted in a holder on the body of the microtome.

The specimen is prepared and attached to the holder and the rocker is then operated. On the descending stroke of the arm the specimen comes into contact with the cutting edge, which is in the form of a razor or a special microtome knife, and a section is cut; on the upward movement of the rocker arm the special ratchet causes the arm to move forward in accordance with the thickness of section required. The operation of the rocker arm will then allow a further section to be cut, and the whole process is repeated until sufficient sections have been obtained. The outstanding feature of the instrument is that each section remains temporarily attached to the cutting blade only to be removed by the succeeding section, the trailing edge of each section adheres to the leading edge of the next and as a number of sections are cut they form a ribbon, each section in the ribbon being directly successive to that before.

The ribbon has many advantages over individual sections. Five or six sections attached to each other are far easier to handle than individuals, there is no worry over keeping them in proper succession, and it is far easier to picture the complete specimen from a series of sections all of the same thickness than from any number of hand sections of varying thickness. As a ribbon reaches its required length it may be freed from the cutting by simply lifting with a pair of blunt forceps. The writer has found it best to lay ribbons of sections out upon a sheet of black paper; this will provide a contrasting background against which the sections may be plainly observed, and any faults may be detected. Such faults will be discussed in the next part of this article.



Section of a sample of canned animal food showing various tissues including lung. (Magnification ×150.)

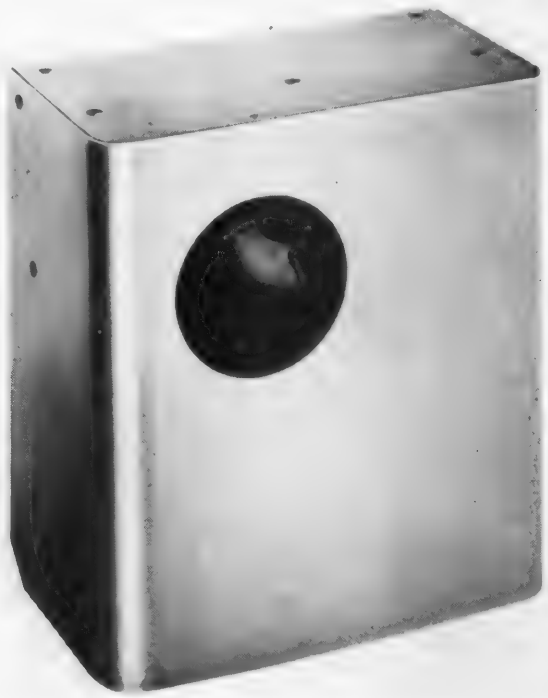


The Common House Fly, *Musca Domestica.*

How to deal with FLIES

The common house fly " is probably the most dangerous insect to be found in this country " says this short article, which describes the latest techniques, devised by Disinfestation, Ltd., of eliminating this filthy insect from food factories.

RATS and mice sneak into premises, Pharoah's ants lurk in cracks in walls, cockroaches emerge at night, wasps threaten to sting, but the common house fly will brazenly enter any open door or window and appear to be virtually harmless. Perhaps, because its habits are so bold and the fly is such a familiar sight, many people are apt to take this filthy creature for granted and not question its behaviour. The fact is, however, that the fly is a prolific pest with a criminal record. It is probably the most dangerous insect to be found in this country and consequently it cannot be tolerated in the food factory.



The " Synchromist " electric insecticide dispenser.

Food manufacturers jealous of their reputation for hygiene will have little patience with the hard-worn jokes which in the past have made flies a subject for levity. They will have no compunction about " hurting a fly," will see nothing funny about flies which " crawl up the window," and take no interest in where " flies go in the wintertime " or how they land upside down on the ceiling. Of all the everyday expressions concerning flies, the only one they are likely to favour is " no flies on us."

Unfortunately, the fly is so casual in its activities that it is very difficult to be free of flies unless an effective method of fly protection is in operation to give the food manufacturer the necessary confidence that there are indeed no flies on him.

It is true that, thanks to modern refrigeration and the removal of temptation, a great deal of food is nowadays protected from the attentions of flies. But the problem remains sufficiently serious for one enterprising re-

A pressurised spray being used to flyproof walls, lights and pendant fittings where flies alight.

frigeration salesman to display in his window a sign which read: *If you followed a fly for a day you wouldn't eat for a week.*

What did the salesman mean?

Flies breed on muck

Let us begin at the beginning of a fly's short but sinister life among us. An uncovered dustbin, a dropping pit in a poultry house, a manure heap outside a stable, animal refuse in the street—all these sordid places are attractive to flies. This is where the female lays her eggs, for the larvæ breed on muck.

There are many species of fly, but the common house fly, *Musca domestica*—which is by no means merely a domestic species—is the most serious socially and economically. In less than a fortnight one female fly may lay between 600 and 900 eggs, a prodigious output.

Disease carriers

It is because of the disease carrying ability of a *single* fly, and the breeding capacity of but one female, that the fly menace is so great. The problem is how to kill quickly even the solitary fly which enters the premises. Because there may be only a few flies about there is sometimes a misguided temptation not to bother about fly control, but flies cannot be ignored.

FLY CONTROL TECHNIQUES

Special techniques have been developed for the effective control of flies. Briefly, they consist of (a) an automatic electrical insecticide dispenser providing controlled periodic metered doses; (b) flyproofing large areas where flies alight; and (c) treating "hot spots" or alighting areas favoured by flies with a more powerful insecticidal formulation.

These three methods, which may be used individually or in conjunction, are offered by Disinfestation, Ltd., and are known as the *Synchromist*, *Flyproofing* and *Flytrol* respectively. They have resulted from intensive research at the Rentokil Research Laboratories, East Grinstead, Sussex. Selection of the correct technique, or combination of techniques, is decided by a Disinfestation pest control expert who will survey premises free of charge and without obligation.

1. Automatic insecticide dispensing

The *Synchromist* electrically operated device is really an automatic aerosol, and it enables the food manufacturer to control not only flies but other winged pests such as the adult cacao or tobacco moth, *Ephestia elutella*.

In appearance the device is a neat metal box, and it is simply and unobtrusively mounted on a shelf or wall at least 6 ft. from the ground and plugged into a power point.

Every fifteen minutes a tripmeter operates the aerosol and a measured quantity of safe, concentrated insecticide is emitted into the atmosphere. The firm say that it will control a volume of 6,000 cu. ft., and providing there is no great displacement of air, kill all flies present in the space within 15 minutes.

This fully automatic method of permanent fly (and moth) control is claimed to be ideal for all premises where food is exposed. It is further claimed that the insecticide used cannot contaminate food and offers no hazard to humans or warm-blooded animals. It employs a high concentration of pyrethrum plus piperonyl butoxide, a safe insecticide with instant knock-down properties.

Disinfestation, Ltd., supply units on a contract hire basis, or units and refil aerosols may be purchased from the company.

The replacement cycle of the aerosol is very economical; the 12 oz. aerosol will last for 34 days if operated continuously, 48 days if operated 12 hours a day, and 102 days if operated 8 hours a day, that is, switched off at night.

One unit is suitable for controlling flies in the storeroom, canteen, or kitchen, and in larger areas, such as factory production floors, effective control can be ob-

tained by fitting a sufficient number of units to cover multiples of unobstructed and reasonably draught-free spaces of 6,000 cu. ft.

2. *Flyproofing*

This is a method of application which employs a powerful new insecticide, and wall surfaces and pendant fittings where flies alight are treated by means of a pressurised spray so that these treated surfaces become lethal to flies. There is a residual effect and by treating at three monthly intervals permanent control is secured throughout the fly season.

Disinfestation, Ltd., carry out *Flyproofing* treatments in various establishments where food is processed, packed, prepared or consumed. Recently, a well-known chain of supermarkets had every shop treated by this method.

3. *Dosing selected areas*

Claimed to be the most modern method of all, the *Flytrol* technique employs larger concentrations of the new insecticide in selected areas where flies are known or likely to alight. This technique has been developed as a result of 12 months' research at the Rentokil Research Laboratories.

The technique is claimed to have many advantages. It can be applied to a variety of sites in one building, and effective control can be obtained no matter how large the premises or how complicated their layout.

The insecticide is long lasting so that two treatments will provide permanent control throughout the fly season. Exposed foods cannot become tainted through the use of this insecticide, and the chemical used is one which will kill flies which have become resistant to ordinary insecticides.

Free advice on the latest techniques may be obtained from the Pest Advisory Centre, 16, Dover Street, London, W.1 (Hyde Park 0061).

Correspondence

Stabilised dairy cream not in the consumer's interest

SIR,

At last the Milk Marketing Board have realised that dairy cream is not sufficiently stable after whipping for general use in cakes and modern flour confectionery production, and they now propose to support a request that it be permitted to add a stabiliser. They even go so far as to say that it was the general opinion of the dairy trade that the addition of some form of stabiliser would be an advantage, and benefit all concerned!

They do not, however, define who they mean by "all concerned." Is it the dairyman—the baker—*and the consumer*? It certainly benefits the dairyman because it will help him to sell an otherwise difficult product; it will help the baker because it will enable him to overcome some of the many drawbacks of using dairy cream in flour confectionery, but does it help the consumer?

To begin with, the consumer will no longer be getting *pure dairy cream*. It may be "stabilised," or "fortified" cream, but certainly not pure dairy cream. In fact, once it has had an additive in the form of a stabiliser it is no longer dairy cream as it left the cow. So to start with it can no longer be called pure dairy cream because it would be deliberately deceiving the public. Much play has been made on the name "Dairy Cream" (to which no one has objected) as it tells the consumer what he is getting. But if the product is such as will require a stabiliser to make it useable, then the public must be told by dropping the word "Dairy" and replacing it with the word "Stabilised."

Now comes the second point. Why does dairy cream require a stabiliser? Is it because the emulsion starts to break down and the moisture seeps into the cake? Breakdown of the emulsion is nature's way of indicating the breakdown of the product, and breakdown in dairy cream means the rapid increase in bacterial count. The addition of a stabiliser will remove nature's warning but it will not reduce the bacterial build-up. Will the consumer, therefore, be one of the beneficiaries referred to in the Milk Marketing Board's statement that the addition of a stabiliser would be an advantage, and benefit *all* concerned?

Have not the Public Health Authorities stated that to add something to a product to mask the natural warning of breakdown can be dangerous, as it removes indication to the consumer between good and not so good?

It rather looks, therefore, that the Milk Marketing Board are trying to overcome their own problems at the expense of the consumer. It is also an admission that pure dairy cream as such is not a commercial proposition for use in modern flour confectionery.

Last, but by no means least, if it is finally agreed that a stabiliser can be used in dairy cream, then it must be appreciated that the product has been de-natured—it is no longer "dairy cream" but "stabilised cream" and must be sold as such if the public are to be fully informed "of the nature and substance demanded" as so many Food Inspectors with whom we come in contact constantly stress.

It is hoped these important points will be fully considered when the matter is raised with the Ministry.

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MIXED FRUIT BARS

Survival rations and commercial possibilities

By R. Self, H. L. J. Rolley and A. E. Joyce*

Developments in the manufacture and packaging of a range of dehydrated mixed fruit bars and similar products at the M.A.F.F. Aberdeen Research Establishment are described in this article. Requirements of a military survival ration based on these are discussed. A.F.D. techniques have played an important part in the work, and a number of interesting commercial possibilities have arisen. Effects of moisture content on texture and storage life are discussed.

MANY of the general problems of food science find their most acute application under the special circumstances of military or expedition feeding. Rations for field use must incorporate to the utmost the principles of reduction of weight and bulk, stability, nutritional adequacy, palatibility and ease of preparation; and in the most extreme cases one must allow for the possibility that no water, heat or cooking equipment may be available.

With this in mind, the Research Establishment of the Ministry of Agriculture, Fisheries and Food developed a widely accepted meat bar,[1] to replace the traditional pemmican, which can be eaten reconstituted in hot water as a stew, or eaten directly without any preparation whatever. Several types of fruit bars have also now been developed, with properties which render them equally adaptable. The development work on the composition of a suitable dehydrated fruit bar was based on apples. Dehydrated apple dice have been compressed into blocks for inclusion in military type rations for some time but this product was not palatable for dry eating, even though when reconstituted, with the addition of sugar, it was a most acceptable sweet.

With the introduction of a period of freeze-drying (applying the new process of Accelerated Freeze-Drying[2, 3]) the reconstitution became more rapid and complete, and with some 4-5 hours of freeze-drying out of a total drying time of 8 hours the product was fully reconstituting in 1 minute in hot water. Sugar was added and stirred in after reconstitution. This product was called accelerated freeze-dried apple and played a very important part in the development of the fruit bars.

* Formerly of Ministry of Agriculture, Fisheries and Food Research Establishment, Aberdeen.

Dry eating v. reconstitution

Concomitant experiments were made to produce an apple product which was sweetened sufficiently to permit eating dry and also capable of reconstitution to give a hot sweet. For dry eating the hardness of the product is important, and it was ultimately found to be extremely difficult, if not impossible, to produce a bar both reasonably soft and completely free from browning reactions over a storage life of two years at room temperature. (It should be mentioned that non-enzymic browning in apple does not give rise to any marked deterioration in flavour until it reaches an advanced condition.) It was also found that for softness, the sugar in the sweetened product needed to be in the crystalline form, as in a fondant, and not in the solid solution state of a boiled sweet.

The effects of sugar on the reconstitution characteristics of the material were two-fold; namely, sugar, whether present in a solid solution with the fruit juices or in crystalline form, depressed the amount of water taken up by the product by approximately half; furthermore, if sugar were present in the "glassy" state, reconstitution in hot water required only one to two minutes without any simmering. If in the crystalline form some ten to fifteen minutes was necessary. It therefore appeared to be impossible to combine all the best attributes of a survival ration, i.e. complete and rapid reconstitution with excellent palatibility in dry and reconstituted state, in the same material.

In all, some seventeen different fruit mixtures were developed with the sugar present in the form of a solid solution. The more palatable combinations were subsequently produced with the sugar in crystalline form; at first by the use of an interrupted drying technique on the sweetened mixture and finally by blending icing sugar together with freeze-dried apple and a binding agent.

Two further types of bar were developed, one based on apple and an apple-juice toffee known as an apple toffee bar, the other on sun-dried fruits, e.g. dates and raisins with mixed nuts and milk powder. The latter was definitely for dry eating and was designed to be higher in calorific value and protein content.

MANUFACTURE

Raw materials

Four varieties of apples were used in these experiments, namely Bramley pippin, Sturma pippin, Grenadier and Lord Derby. The first was the apple of preference and was best, both in respect of ease of drying and rapidity and completeness of reconstitution, if used when ripe after a period of indoor storage at room tempera-

ture in December, or from cool storage in early spring or gas storage in late spring.

The other tree fruits used, i.e. apricots and peaches, required to be fully ripe or else the flavour was poor and reconstitution slow and incomplete. Yellow peaches gave the product a better colour than white, but it proved difficult to obtain imported yellow peaches with a good flavour. In fact colour had often to be sacrificed in the interest of flavour, and white-fleshed dessert varieties were employed. In the product containing pineapple, best results were obtained using pineapple from the Azores. The ginger used was crystalline root ginger, and care was needed in selection of this as some brands were much weaker than others and resulted in a lack of ginger flavour in the product.

The other fruits employed were those commercially available in local wholesale markets and in the case of the citrus, attention was paid to the conditions of the outer skin which required to be well coloured and free from blemishes.

Preparation of accelerated freeze-dried apple dice, etc.

Apples of suitable maturity were cored, peeled by hand, soaked in a 1% sodium sulphite solution for 5 minutes (to prevent enzymic browning), then stored in water until required. For dehydration the apple was cut into $\frac{3}{8} \times \frac{3}{8} \times \frac{1}{16}$ in. dice in an Urschel dicer. The dice were then loaded into the A.F.D. cabinet[2, 3, 4] at a loading of 2 lb. per square foot.

To the apple prior to dehydration could be added citrus pulp, apricot or peach (as dice or slices) or wild brambles or blackberries. These fruit combinations without sugar gave excellent quick-cooking fruit mixtures. Apricots, peaches and brambles would also dehydrate by themselves to give an excellent product.

Preparation of A.F.D. apple, etc., with sugar in solid solution

In the very first experiments it was found that when granulated sugar was mixed with apple dice in quantity, there was sufficient moisture available on the wet surface of the dice to dissolve an appreciable amount of the sugar. This resulted in the dice being bathed in strong syrup, and in consequence water diffused out of the dice and the volume of the syrup increased rapidly. This syrup was lost when the mixture was placed on the trays of the drying cabinet; a large proportion ran off in loading and the remainder rolled off as a foam when it boiled under reduced pressure in the cabinet.

The syrup formation was overcome in two different ways; the first was by straining off and concentration in a steam jacketed pan, the resulting apple "toffee" being mixed with the A.F.D. apple dice during the last hour of drying. The product will be described later in the paper.

The second, more easily managed, technique was to submit the apple dice to 1½ hr. vacuum dehydration, with a very high rate of heat input to prevent evaporative freezing, before mixing. If the dice were allowed to freeze and undergo any freeze-drying during this preliminary drying period, then on removal from the cabinet they thawed and produced an even worse drip problem.

During the 1½ hours preliminary drying the apple dice lost in the region of ⅓ to ½ the water content. On removal from the cabinet granulated sugar was mixed in the proportion set out in Table 1. If other fruits were required they were best added at this stage, apricots and peaches as dice in ⅜ in. form, the fruit first being halved, stoned and sulphured; brambles and cranberries as whole berries; bananas as slices; coconut desiccated; ginger diced. Citrus fruit had the outer layer of peel removed and retained. The peel was subsequently milled with the flesh in the ratio of 2:10 and the pith was discarded.

The appropriate blend of fruits and sugar, thoroughly mixed, was then dehydrated on aluminium trays by the technique already described. The product was in the form of brittle sheets, the particles of fruit being embedded in a clear and glossy matrix like a boiled sweet.

Preparation of A.F.D. apple, etc., with sugar in crystalline form

The production of material with sugar in the crystalline form appeared to be one way of overcoming the hardness of the above product. Three methods of production were tried:

1. By subjecting the above material to a temperature of 37°C. (provided moisture content was less than 4·3%) for about 7 days and so inducing sugar crystallisation. This method had the disadvantage that browning reactions were very definitely accelerated. It was, however, found that in material containing a proportion of ripe apricot, crystallisation commenced within six weeks of making, without an initial period at 37°C.

2. If the material were removed from the drying cabinet once the majority of the thermocouples in the material had reached 40-45°C., i.e. 1½ to 2 hours before drying was complete, and rapidly mixed in a mechanical mixer, followed by spreading on to a slab, then sugar crystallisation took place immediately. Without non-sticking surfaces this technique was difficult to handle. It was successfully modified in a specially designed laboratory scale plant. In this raw apple dice and sugar were mixed in a glass vessel immersed in hot water at 50-60°C. The vessel was evacuated to 1 mm. mercury absolute pressure, and the contents stirred by a scraper blade. This gave rise to a very stiff paste with the sugar in the crystalline form and containing apple dice. This would probably be worth trying out on a large scale with a steam jacketed pan under vacuum.

3. The final method employed and the one found under the prevailing circumstances to be most expedient was to make icing sugar into a paste with apple juice or citrus pulp, then mix in A.F.D. apple dice. The proportions employed were—A.F.D. apple, 14 parts, comminuted citrus pulp 9 parts and icing sugar 28 parts. If

desired, water or apple juice was used to replace the comminuted citrus pulp. Citric acid and ascorbic acid were added if required (see below).

In all the above variations the product could be moulded into slabs $11 \times 3\frac{1}{4} \times 3\frac{1}{4}$ in., and when these had hardened they could be cut into individual bars. This material tended to have a moisture content in the range 8-10%, and in consequence to obtain the necessary storage life for military purposes it had to be after-dried in the vacuum cabinet at a temperature of 50°C. for $1\frac{1}{2}$ hours to give a final moisture content of 2-4% (with some loss of softness).

The last type of bar developed was made from milling nuts and "sun-dried" fruits together with whole milk powder and ascorbic acid. The mixture was worked into a slab with care not to squeeze out the nut oil. For the cheapest bars "roast peanuts," Iraq dates and milk powder were used, but a variety of ingredients—cashews, brazils, hazelnuts, pecans, walnuts and fruit, raisins, apricots, figs, prunes, pears and bananas—was tried.

The slab of mixture after hardening could be cut into bars and these appropriately wrapped. No vacuum dehydration was used on this material.

Table I. Analyses of Fruit Mixes

A = Apple, B = Banana, C = Coconut, D = Date, G = Grapefruit, Gn = Ginger, Cr = Cranberry, Apr = Apricot, L = Lemon, O = Orange, R = Raisin, P = Peach, S = Sugar, Br = Brambles or Blackberries

Compounds	*Ratio of components (fresh trimmed wt.)*	*Drying ratio*	*Moisture content %*	*Titratable acidity Ml.N.NaOH/ 100 g.*	*Cals./ 100 g.*
A	—	8·0 : 1	4·00	—	290
Apr	—	8·0 : 1	4·00	—	250
AS	5 : 1	2·7 : 1	4·06	36·5	354
AR	5 : 2	3·6 : 1	4·65	40·8	322
AD	3 : 2	2·6 : 1	4·29	22·0	293
A Gn S	10 : 3 : 2	2·7 : 1	5·03	56·5	357
A Apr S	2 : 2 : 1	3·4 : 1	5·03	29·5	350
A B S	8 : 6 : 1	4·6 : 1	3·66	30·4	327
A P S	5 : 2 : 1	4·4 : 1	5·07	54·0	357
A Cr S	20 : 5 : 6	3·5 : 1	4·43	85·0	339
A Apr S Gn	7 : 6 : 3 : 1	3·3 : 1	—	—	368
A P S Gn	32 : 15 : 8 : 4	3·5 : 1	4·81	31·0	357
A L S	40 : 3 : 12	3·3 : 1	4·78	46·0	357
A O S	40 : 3 : 12	3·4 : 1	4·08	34·0	364
A G S	40 : 3 : 12	3·3 : 1	4·50	30·0	375
A B O S	45 : 25 : 6 : 13	3·4 : 1	4·35	18·0	347
A B L S	45 : 25 : 6 : 13	3·5 : 1	5·12	35·5	339
A B O C S	20 : 10 : 3 : 5 : 6	2·6 : 1	4·03	20·0	439
A B L C S	20 : 10 : 3 : 5 : 6	2·9 : 1	4·88	31·8	428
Br	—	6·0 : 1	4·00	—	—
A Br	5 : 1	7·0 : 1	4·00	—	—

Analytical determinations

The analyses in Table I were performed on dehydrated material unless otherwise stated.

The moisture contents were determined using the vacuum oven technique (A.O.A.C.[5]) and titratable acidity by the A.O.A.C. method.[6]

Ascorbic acid determinations were carried out on a range of these products using a modification of Curtis's method.[7] The figures obtained showed variation of between 30 and 40 mg. of ascorbic acid per 100 g.

Cooking ratio followed very closely the drying ratio except in mixtures containing ginger, where it was approximately 20% lower, presumably caused by ginger suppressing the moisture uptake of the apple.

PACKAGING

It was difficult to compress and package the A.F.D. apple since it was brittle and readily shattered. If compresed too much it also became very difficult to reconstitute.

Moulding and packaging

By the use of pressures of the order of 600 p.s.i. with dwells of 10-15 seconds, blocks have been made retaining the very rapid reconstituting properties of the A.F.D. dice. These blocks are not suitable for vacuum packaging, since the atmospheric pressure exerted by the package is sufficient to crush the block and destroy its internal structure entirely. This is in fact true for all these types of material.

The moulding of the A.F.D. apple and sugar and mixed fruits with sugar in solid solution proved very difficult. It was found possible to remove the product as a "mat" from the drying tray while still thermoplastic. This mat could be guillotined into rectangular blocks similar to chocolate bars, and might have provided a practicable solution if suitable non-sticking surfaces had been available.

All the mixtures based on sugar in the crystalline form were moulded into an aluminium grid in a flat tray, and when hardened the grid was removed and the slabs cut into suitable bars. For long storage these had to be after-dried from 8-10% moisture content down to 3-4%, but not without some loss of softness. The nut bar material could be cut into bars from the slabs.

The prime consideration in packaging of the bars containing apple and/or sugar and other fruits in various combinations was the exclusion of moisture. Apart from packaging in tins it was found possible to use *Metathene* pouches with some success. Vacuum packing was not successful for reasons already stated.

In the case of the nut bars such experience as was obtained with storage life suggested the need for an inert atmosphere, which could not be obtained by vacuum packaging as the atmospheric pressure exerted by the wrap squeezed out the oil, and which, therefore, demanded gas-packing.

Storage life

The apple type bars will last from two to four years in temperate climates, depending on the moisture content. If this is below 4% very little if any discoloration due to non-enzymic browning will take place. Apple products will tolerate a considerable amount of non-enzymic browning before any deterioration in flavour occurs. The accelerated freeze dried apple without sugar is still quite edible after nearly four years of temperate storage. There is much less knowledge on the storage life of the nut bar product, but there is evidence to suggest that they would require an inert atmosphere for satisfactory storage.

DISCUSSION

In this paper an endeavour has been made to outline most of the methods and products which were investigated. The reason for any one of them being discontinued was quite often expediency and lack of suitable equipment, not necessarily lack of palatability. The method finally adopted for the production of fruit bars was that based on the use of icing sugar. This, with the limited equipment available, was the most rapid method of production.

Commercial possibilities

By including a description of the types discontinued it is hoped that interest may be stimulated in these materials since they had very distinct merits, e.g. the use of apple dice in combination with inverted sugar could give rise to a new type of boiled sweet. Also, under certain conditions, this product, although hard, could be considered for use in a survival ration. The apple toffee product also, with more experimentation and suitable equipment, could well have a wide variety of uses. By describing the methods employed in the making of these bars it is hoped that others will obtain encouragement to experiment with modifications rather than assume these types of product are impossible to produce.

Throughout this work there was a diversity of opinion on what was the most acceptable type of bar. Those who normally chew boiled sweets preferred the sugar as a solid solution. Others preferred the sugar to be crystallised. It was interesting to note that, for a given quantity of sugar, the solid solution was much less sweet than the crystalline form. This is a very important point when it is remembered that sugar is the least expensive ingredient. It was thought advisable to add citric acid in order that the material with crystalline sugar should retain a "clean" flavour and avoid sickliness. It was also found possible to add vitamin C (ascorbic acid) to each of these mixes and so provide an adequate dietary source of this vitamin.

The apple toffee bar was soft but extremely sticky; it was, however, very popular with those who tasted it, but the handling difficulties and lack of suitable non-sticking equipment prevented its ever being made in quantity. Towards the end of this study small scale laboratory experiments were conducted in which the apple toffee was made from boiled sugar and apple juice by stirring in A.F.D. apple dice before allowing to set. This product showed very definite promise.

As stated in the introduction, it proved impossible to combine all the desired features in one bar since rapid and full reconstitution could not be combined with acceptable dry eating. It was, however, possible to obtain in the solid solution bar a fairly good product for dry eating and an excellent reconstituted product except that water uptake was reduced by half compared to apple alone. This fact did not in any way destroy the reconstituted texture. The bar containing the coconut did not have a very inviting appearance, although the taste was quite pleasant. The apple toffee mixture stewed up very quickly to give a product with an excellent flavour of "oven baked apple."

One of the mixtures, namely apple, apricot, pineapple and sugar, when cooked made a very pleasant salad, and the appearance was improved by the use of the apricot as thin slices. The bars with crystalline sugar made excellent dry eating but were slow to reconstitute, and, in consequence, were not very suitable for a dessert.

Several of the mixtures, including those prepared without and with sugar (as solid solution) could be thickened with cornflour and egg yolk to give a rich flan filling, the apple being used as a suitable carrier and diluent for a more expensive flavour. The non-sweetened materials not only took up more water but were instantaneously reconstituting in warm water. For the larger pieces of apricots and peaches, e.g. halves and slices, the skin needed to be removed prior to dehydration.

From these investigations it has been possible to show that accelerated freeze drying can either produce suitable components for making up fruit bars for survival ration purposes or produce the bar itself from a mixture of ingredients. Also the components themselves, by virtue of their extremely rapid reconstitution, have a considerable potential as the basis of desserts.

Acknowledgements

We should like to acknowledge the interest of Lt.-Comdr. Erskine, R.N., at whose suggestion the bars were first made, and that of many of our colleagues. We also thank the members of the Falkland Island Dependencies Survey parties who over the past few years consumed several thousand of the different types of bar and by their requests for further supplies considerably stimulated the work.

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U.K. Food Prices are Low, says Minister

FOOD prices in Britain are relatively low, said the Agriculture, Fisheries and Food Minister, Mr. Christopher Soames, turning down a proposal in the Commons for an investigation into the U.K.'s food distribution system.

The M.P. who urged this step, Mr. William Hamilton (Labour, Fife W.), declared that food prices in this country were higher than in some Continental countries, despite the £250 million in subsidies paid to farmers. Mr. Soames replied that the £250 million represented only 5% of the total cost of food here.

Mr. Gerald Nabarro (Conservative, Kidderminster) said that with the sole exception of Norway, prices of all basic foods in British shops were lower than those in any West European country.

The Minister remarked that it was difficult to be too dogmatic about food prices in different countries because of the different types of foods, different standards and varying systems of distribution.

Chemical additives again

The effect upon human health of chemical additives used in the preparation of food was again raised. Mr. Donald Wade (Liberal, Huddersfield W.), called for action to safeguard the public from harmful consequences.

Mr. Soames said there were already arrangements for controlling the use of chemicals for this purpose. Chemical additives used in the preparation of food were watched over by a Sub-Committee of the Food Standards Committee. Regulations were made under the Food and Drugs Act to control the presence of chemicals in food when this was necessary for the protection of consumers.

Milk and bread: considerations "well forward"

When an M.P. sought a Government statement of policy in the light of the Report of the Cook Committee on Milk Composition in the U.K., the Minister said that consideration of this complex subject was well forward.

He hoped to discuss its implications with both sides of the dairy industry and with other interested organisations before the end of summer.

The Minister also said he was hoping to circulate in the autumn his proposals following on the Food Standards Committee's Report on Bread and Flour.

Mr. Marcus Lipton (Labour, Brixton) urged Mr. Soames to issue a final decision on this long before the autumn, "because in the meantime this staple article of food is being chemically tampered with for the benefit of the millionaire milling combines."

Mr. Soames repled that comments were invited earlier this year from a number of manufacturers, local authorities, trade organisations and private individuals. It was a complicated technical and scientific subject.

The President of the Board of Trade, Mr. Reginald Maudling, announced that he had given a direction that when an application was made for the registration of a mark for non-alcoholic drinks and some similar foods a search should be made for similar marks registered for such things as drugs, disinfectants and cleaning materials. The converse would also apply.

This move followed complaints by M.P.s about a soft drink being marketed under a name similar to that of a detergent. Concern was voiced at the possibility of children mistaking the bottles. An M.P. said that a detergent known as *Sundrops* could easily be mistaken by a child for a soft drink known as *Sundrop*. Mr. Maudling agreed to look into it. Later he told the House that directors of the companies concerned had expressed to officials of his department their sense of the importance of avoiding any confusion on the part of the public between their respective products.

"No risk" from T.B. food handlers

It was generally accepted that the handling of food by tubercular persons involved no risk of spreading infection to the consumers, stated a Government spokesman, Lord Newton, in the Lords, when the proposal was put forward that tuberculin testing should be made a condition of entry into the catering and food trades in Soho.

He said that laying down this condition would be unjustifiable.

Proposed changes in Weights and Measures Bill

Among a number of changes incorporated in the new Weights and Measures (No. 2) Bill is that meat pre-packed overseas will not have to be marked with quantity, so long as this is made known to the buyer before payment.

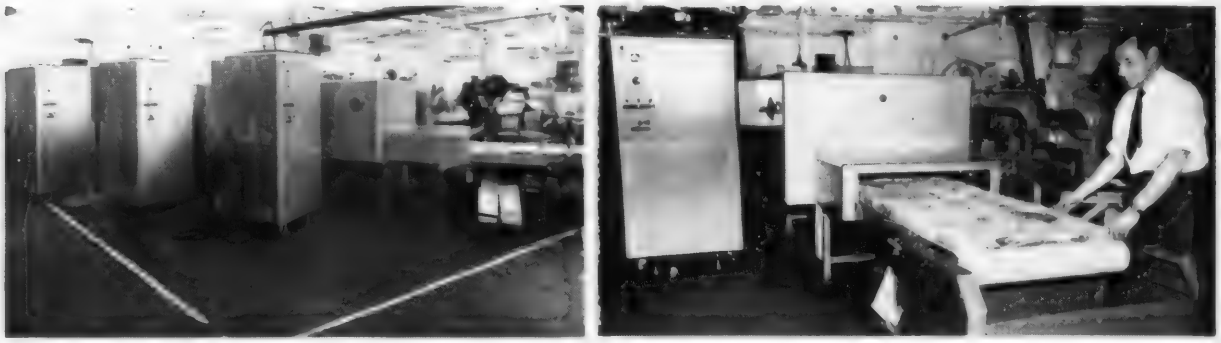
Another provision affecting self-service stores selling goods subject to high evaporation means that the seller's obligation can now be met by the provision of equipment allowing the purchaser to check the quantity. These are only two of a series of changes from the original weights and measures legislation introduced to Parliament. The first measure failed to get through because of the shortage of Parliamentary time last session. The No. 2 Bill is scheduled to come into effect six months after completing its passage, but the principal commodity provisions are to be delayed another two years to give traders time to adapt their methods.

Butter deception alleged

Mr. Soames agreed to look into cases where, it was alleged, butter from the Commonwealth was being mixed with foreign butter and retailed with a "Home Produced" label on it.

Mr. P. B. Browne (Conservative, Torrington) offered to send details of this practice to the Minister.

MACHINERY and EQUIPMENT



This dielectric fish defrosting plant which has been installed in a Grimsby factory is claimed to be the first of its kind in the world, and thaws deep frozen fish at – 30 F. continuously at the rate of a ton an hour by radio-frequency energy. (*Left*): General view of the installation showing the three tunnel ovens with generators. (*Right*): Thawed slabs of fish emerging continuously on a conveyor belt.

DIELECTRIC DEFROSTING

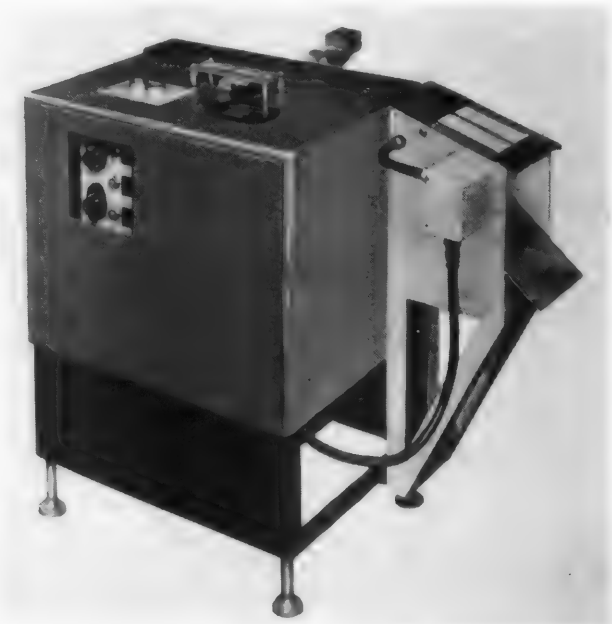
What is claimed to be the first full scale production dielectric defrosting plant in the world has recently been installed in one of the Grimsby fish processing plants of Ross Foods, Ltd. Based on radio-frequency industrial generators, the plant was designed on results of research carried out by the Torry Fishery Research Station of D.S.I.R. It is claimed that the new technique results in completely consistent thawing throughout the mass with simple and accurate control of final temperature.

The new plant consists of three tunnel ovens in series, each powered by a 12 kW industrial r.f. generator energising a balanced pair of electrode plates situated in each oven. The frozen fish slabs, at a temperature down to −30°F., pass through the ovens on a continuous conveyor belt 32 in. wide beneath a balanced pair of electrodes. Conveyor speed can be varied. The belt is continuously cleaned by a nylon brush and water jets. As a result of the unit construction, greater throughputs can be obtained simply by adding further generator-oven units and by increasing the belt speed accordingly.

The only adjustments required in operation are to match the speed of the belt to the energy input required for various types of fish, and to tune the electrodes by air gap variation. This is carried out by means of a handle situated adjacent to the generator.

It is said that early results achieved with the plant have been remarkable, particularly as regards the consistency of the process. Frozen slabs of imported filleted herrings, for example, weighing 10 lb. each and about 2¼ in. thick, are loaded at a temperature of between −20°F. and −30°F.; they traverse the ovens in about 12 minutes and emerge at just below freezing point. Normally there is less than one degree variation between the temperatures of any two points in a slab, or from one slab to another. The fish is in perfect condition for further processing and all danger of rapid deterioration is eliminated.

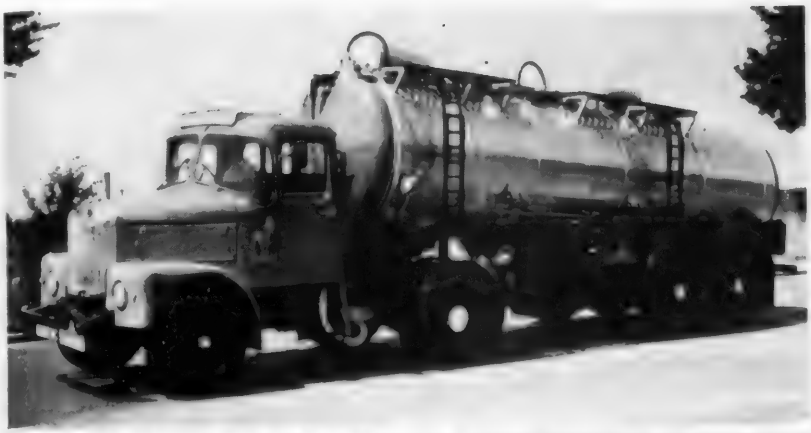
The following advantages are claimed. Due largely to the almost complete absence of waste heat, processing cost is low; the rapid throughput means that sudden changes in demand, typical of this market, can be accommodated in a way which the slow water and hot-air processes could not match; there is virtually no "drip loss," as in the case of air or water heating, leading to loss of weight and flavour; little space is occupied, and the whole operation is much cleaner and more convenient.



This Telomex high-speed check weigher has a capacity of up to 400 packs per min.

HEATED TANKER

Fitted with the latest heating equipment, a new Scammell *Highwayman*



(Top): **A Scammell " Highwayman " articulated 8-wheel 2,700 gal. chocolate tanker built for the Caxton Chocolate Co., Ltd., which is heated electrically by " Isopanel " heating blankets made by Isopad, Ltd.** *(Bottom)*: **This picture shows how the electric blankets are fitted to the tanker.**

tanker has been completed for the Caxton Chocolate Co., Ltd. This tanker, the second to go into service with the company, will be used for carrying couverture chocolate, a commodity which must be maintained at a constant temperature of about 120°F. in order to prevent deterioration. To meet these conditions the two-compartment, 2,700 gallon tank is electrically heated by thermostatically controlled electric *Isopanel* heating blankets. The heating system is made and supplied by Isopad, Ltd.

CONTINUOUS FLOW CHECK-WEIGHER

A high-speed machine capable of check-weighing packs up to speeds of 400 per min. has been produced by Telomex, Ltd. The check-weigher receives packs from a conveyor or chute, transports each pack over the weighing platform and check-weighs each pack whilst it is moving over the platform, delivers all acceptable packs to a take-away conveyor, and rejects all packs which are below or above the minimum and maximum allowable weights respectively to a reject take-away system. It also records on high-speed counters the number of overweight, underweight and correct weight packs passed over the check-weigher. Due to the use of transistors in the equipment, the reliability is very high and no warming-up period is necessary.

METAL STITCHERS

Static or portable, hand, foot, electric or air-powered, *Bostitch* staplers and metal stitchers tackle innumerable fastening jobs in every branch of industry. Emphasis is placed on skilled craftsmanship and design, and *Bostitch* models are claimed to give excellent service after 30 years and more constant use. Container and package sealing with these machines eliminates cumbersome methods, involving nails, cord, sticky tape and glue pots, and furthermore, discourage pilfering, since cartons cannot be opened without detection, yet, at destination, staples can be swiftly removed without damaging the container, which is then immediately available for re-use. Details on application.

FLUORESCENT UNITS

Designed to be equally at home over a food manufacturing process, in a slaughterhouse, a laundry or over a coal sorting belt, *Moorlite* fluorescent units are gasket sealed at every assembly point, and answer all problems concerned with the maintenance of light and cleanliness in difficult situations. The fluorescent tubes are fully protected from the entry of other moisture or dust by acrylic tubes which enclose them. The reflector, on which are mounted all components and lampholders, seats on to a further gasket, and is secured by the only six external screws on the fitting. Details on application.

TAPE DISPENSER

The *Aldwych* pre-determined length dispenser which dispenses film tape up to 2 in. maximum width, in lengths up to 6 in., is time saving and economical to use. Suitable for free standing on bench or table the dispenser is available with slitter device, comprising 15 slitting blades located under the lid, set at ½ in. intervals. By means of an inexpensive modification the dispenser can also be adapted for use with a foot operated pedal, leaving the operator's hands free. Details on application.

This foot-operated " Aldwych " tape dispenser dispenses adhesive tapes up to 2 in. wide in lengths up to 6 in.

NEWS DIGEST

Sugar Confectionery Manufacturers discuss Analytical Methods

The Technical Committee of the International Association of Sugar Confectionery Manufacturers held its sixth session at the Dorchester Hotel in London from June 13 to 15, with Dr. A. A. Houghton in the chair for the first time.

This Technical Committee was inaugurated in 1955 when a General Assembly of the Association was being held at Amsterdam, and it was set the task of examining the existing methods of analysis for the raw materials and finished products of the sugar confectionery industry with a view to establishing official analytical methods acceptable to the industry at an international level.

Delegations were sent to the last session from France, Germany, Italy, Austria, Belgium and Holland; Great Britain was represented by: Dr. A. G. Lipscombe of MacIntosh, Ltd.; Mr. V. Simmons of Mars, Ltd.; Mr. A. Sansome of Edward Sharp, Ltd.; Mr. A. Thomson of Rowntrees, Ltd.; Mr. D. Felstead of Barratt and Co., Ltd.; Dr. E. Steiner of B.F.M.I.R.A.; and Mr. C. Hinton, late supervisor of research at the British Food Industries Research Association and formerly chairman of this Technical Committee

The proceedings were opened by Mr. Mannkopf, the president of the International Association, after the delegates had been welcomed to London by the president of the Cocoa, Chocolate and Confectionery Alliance of Great Britain, Mr. L. H. Atwell. Among others present were M. Jean Herbet, the International Association's founder president, M. Jean Vialla its director, Col. A. Walters and Mr. S. Marks.

The principal business of the session was again concerned with the further study of analytical methods and the assessment of the practical laboratory work carried out since the previous meeting in 1959 at Lyon. Further comparative analytical work has been completed on the determination of moisture and of sucrose in high boiled products and caramels, and of sucrose in low grade sugars and invert sugar syrups.

In addition experimental work had been carried out on the determination of dextrose and maltose in samples of liquid glucose by chromatographic techniques.

Consideration was also given to the confused situation existing throughout the world on the widely differing permitted lists of edible food colours, and as to the best methods to reach uniformity in these lists.

At the Lyon meeting it had been decided to publish the details of the methods adopted in the form of a reference book, and it was announced that this would appear in the Autumn in French, English and German.

Expanded plastics for insulation and packaging

Commencing at the end of this year, Venesta Plywood, Ltd., will produce expanded plastics at its Erith, Kent, factory, beginning with expanded polystyrene. The first objective starting next January is an output of 1,000 tons. Initial investment in machinery and working capital is about £350,000, but more is likely to be needed as the U.K. market develops.

Main uses for expanded polystyrene are in insulating low temperature stores and refrigerated transport, for thermally insulating buildings, and in packaging. Sales will be handled by a separate selling organisation, and the research and development department is being expanded. Production of boxes and cases at Erith will now cease but will continue to be made at the company's Manchester, Wednesbury and Glasgow factories.

A.F.D. symposium

As already mentioned in our July issue, a symposium on the freeze-drying of foods will be held at the Borough Polytechnic, London, on October 19 and 20. Full details of the programme are now available. The symposium will deal with the development of freeze-drying techniques, a survey of the commercial equipment at present available, and a discussion of the potentialities of the technique in various branches of the food industry. Nutritional aspects will also be included. The panel of lecturers will include a number of persons who were concerned with the development of A.F.D. at Aberdeen and others who are at present installing and operating commercial equipment. Pilot plant

The management of Venesta Plywood, Ltd., seen here discussing the use of expanded polystyrene for packaging, are (*l. to r.*): Messrs. H. R. Jones (office manager), J. W. Luffingham (chief accountant), R. McDowell (research and development manager), D. G. R. Reid (director and general manager), W. P. Cruickshank (chairman), D. M. Foulds (general works manager), L. C. Webb (building products sales manager), and R. F. Hawgood (packaging sales manager).

New ideas in

FLAVOUR CONTROL

A NEW SERVICE FOR FOOD MANUFACTURERS

Features of this service include:

1

Exact reproduction of any flavour from your own formulae under conditions of the strictest secrecy.

2

The development of new flavours with guaranteed exclusivity.

3

Standard flavours from a vast and subtle range of spice blends.

4

Spices and seasonings supplied on Salt, Dextrose or yeastless Rusk bases including, where required, ingredients such as Monosodium Glutamate, Milk Powder, Phosphates, and Sodium Metabisulphite.

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Strict grading and control, within fine limits, of flavour, colour, stability and strength.

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GUARANTEED DISPATCH WITHIN 48 HOURS

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All these features are provided within your normal cost range:

they therefore will effect a considerable saving in time and cost on your own production lines.

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SPICEMAX

SALT, DEXTROSE OR YEASTLESS RUSK based, supplied in flavour-sealed bags.

SOLSEA

EMULSIFIED SPICES AND SEASONINGS in airtight drums.

Both types can be delivered IN NORMAL BATCHED QUANTITIES at NO EXTRA COST

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Irwell Chemical Works Ramsbottom Bury Lancashire
also
40 Buckingham Palace Road London SW 1

PRODORITE LIMITED
Eagle Works Wednesbury Staffordshire

SEMTEX LIMITED
50 Blackfriars Road Salford 3 Lancashire
also
19-20 Berners Street London W 1

and model freeze-drying equipment, samples of freeze-dried products and packaging materials will be on display.

Further details can be obtained from the Secretary, Borough Polytechnic, Borough Road, London, S.E.1.

Fish exports top £¼ million

Exports by Mac Fisheries, Ltd., last year reached a record total of over £250,000. The major market was Australasia, accounting for nearly half the total. The remainder was sold to 60 other countries. Fifty different varieties of fish, both fresh and smoked, were handled during the year.

Processing of butchers' bone doubled

After only three months in operation, say the firm, the bone de-greasing plant of Leiner-De Mulder, Ltd., Doncaster, the only one of its kind in existence, has reached an intake of 600 tons of butchers' bone a week, which is nearly double the maximum intake capacity reached by the plant before it was transferred from Treforest.

The company states that this rise in intake capacity has been achieved by improvements to the process, and that the current weekly intake of 600 tons can be immediately increased by 50%, providing adequate raw material supplies are forthcoming.

Leiner-De Mulder, Ltd., was formed at the end of last year by the merger of a division of P. Leiner and Sons, Ltd., and a division of Prosper De Mukler, Ltd., of Doncaster, one of the main renderers in Britain. The bone de-greasing plant, the only one of its kind in existence, was then transferred to Doncaster from Treforest where the maximum intake capacity was 350 tons per week. (See FOOD MANUFACTURE, August, 1960, p. 319, for a description of the plant.)

Carr's new canteen opened

July 14 saw the opening by the chairman, Mr. R. Allen Carr, of a new canteen for Carr and Co., Ltd., the biscuit makers. The canteen was created to provide a comprehensive catering service which, in conjunction with the fully-automated plant for biscuit production installed last year, enables all production plant to operate continuously without break. Catering for all levels of employee, including directors and executives, it seats 350 people at a time.

Anglo-Swiss Food Products, Ltd.—change of name

Anglo-Swiss Food Products, Ltd., manufacturers of Knorr packaged soups and chicken and beef cubes, are to be known in future as Knorr Anglo-Swiss, Ltd.

Campbell's New Research Centre

Campbell's Soups, Ltd., are to build a research laboratory (shown in the drawing above) at their plant at King's Lynn, Norfolk. It will cover 3,400 sq. ft., and part of it will comprise a greenhouse with aluminium strut construction, hot-water heating, thermostatically controlled roof vents and special lighting. The parent company operates ten research laboratories and more than a dozen field study locations. The company's Agricultural Research Department has in the past ten years developed new strains of tomatoes, okra, peppers, rutabas, Scotch peas and mushrooms.

The company is a member of the Brown and Polson Group. Under the title Knorr Brown and Polson (National Catering Division) the two companies have merged their distributive and administrative arrangements and will market the combined ranges of catering packs. This arrangement applies only to the Catering Division.

Colour film about B.B.I.R.A.

A colour film "B.B.I.R.A. in profile," showing all aspects of the work at the Research Station, is now available on free loan from the Information Department at the Baking Industries Research Station, Chorleywood, Herts. It is a 16 mm. film with an optical sound track and runs for about 22 minutes.

Metal Box joins U.S. groups in new plastics venture

The Metal Box Company is to join Shell Chemical and the National Distillers and Chemical Corporation, of New York, in building and operating a U.K. factory for the manufacture of plastic packaging materials.

The venture is said to involve an investment of "several million pounds," and should make substantial supplies of polypropylene film available for the packaging of foods and clothing.

This type of film, stronger and more transparent than that produced from polythene, is already being used in America, but so far it has not been made in quantity in this country. No details have been given of the location or capacity of the new factory, but it is expected to be on stream early in 1963.—*Financial Times.*

Pest control leaflets

Five new pest control advisory leaflets may be obtained free of charge from Disinfestation, Ltd., 16, Dover Street, London, W.1. (tel.: Hyde Park 0061.)

Forthcoming Meetings

Nutrition Society: symposium on "Nutrition and Poultry" to be held at the College of Agriculture, Edinburgh, Saturday, September 30, 13.30 (chairman: S. J. Watson, C.B.E.). Further details from Dr. D. G. Armstrong, The Hannah Dairy Research Institute, Ayr, Scotland.

British Dextrine Manufacturers Association, 6, Holborn Viaduct, E.C.1: conference on "Dust Hazards in the Starch and Dextrine Industries" to be held at the Palace Hotel, Buxton, September 19-20.

S.C.I. Food Group, 14, Belgrave Square, London, S.W.1: symposium "Recent Advances in Processing Cereals" at Royal Society of Medicine, 1, Wimpole Street, London, W.1, September 14 and 15.

Mr. V. B. Diehl

Mr. G. Smith

Mr. J. S. Hendrick

Mr. R. W. James

Mr. B. G. Jones

PEOPLE

MR. V. B. DIEHL, chairman of Nabisco Foods, Ltd., Welwyn Garden City, will be leaving Britain shortly to take up his new major appointment as assistant to Mr. L. S. Bickmore, president of the National Biscuit Company organisation in New York.

*

MR. J. R. TALLEY, vice-president and manager of the Mediterranean and Middle East area of the Coca-Cola Export Corporation, has been named vice-president in charge of operations, with headquarters in New York. Mr. I. Graul, marketing director of the Western European area, succeeds Mr. Talley, with headquarters in Rome.

*

MR. A. H. BRIDGMAN has taken up his appointment as Durban Manager of Coates Brothers and Co. (South Africa) (Pty.), Ltd., one of the Coates group of companies manufacturing printing inks, resins, paints, etc. Mr. Bridgman joined the Coates South African company in 1956, and was for some years Administration Executive at their head office and factory in Cape Town. Coates have other branches in Johannesburg and Port Elizabeth, and a Central African company operating from Salisbury, Rhodesia.

MR. J. S. HENDRICK, marketing manager, MR. R. W. T. JAMES, manager of factories, and MR. G. SMITH, administration manager, have been elected to the board of Oxo, Ltd.

*

MR. A. T. DAVY has been appointed general manager of T. and T. Vicars, Ltd., a member company of Simon Engineering, Ltd. MR. A. J. HINDLEY has been appointed chief accountant and MR. G. TINDALE assistant production manager.

*

The following officers of the Association of Public Analysts have been elected for the coming year: President, MR. J. H. HAMENCE; Vice-president, MR. D. D. MOIR; Hon. Treasurer, MR. R. C. SPALDING; Hon. Sec., MR. F. A. LYNE; Hon. Editor, MR. E. C. WOOD.

*

MR. G. J. CODDINGTON has been appointed national sales controller of Smith's Potato Crisps, Ltd., succeeding MR. T. FOXLEY, who retired in July.

*

MR. H. PITCHFORTH, regional controller in the south-western region of the Ministry of Agriculture, Fisheries and Food has been promoted to the rank of under secretary, succeeding MR. E. JONES-PARRY who has been transferred to the external relations group.

MR. B. G. JONES has been appointed advertising manager of Armour and Co., Ltd.

*

DR. F. H. BANFIELD has become technical director, and MR. P. H. FLECK marketing director, of C. Shippam, Ltd.

*

MR. R. B. FRANZ has assumed responsibility for the whole of the continental operations of International Packers, Ltd., his headquarters being in Antwerp. MR. H. H. HOLCOMB, a director of Armour and Co., Ltd., arrived in England in June after a tour of the plants of International Packers, Ltd., in South America, Australia and New Zealand.

*

Obituary

MR. GUY CHIPPERFIELD, C.B.E., former chairman of BOCM, died suddenly on Wednesday, July 26. He was 67 and retired from BOCM in June, 1959.

*

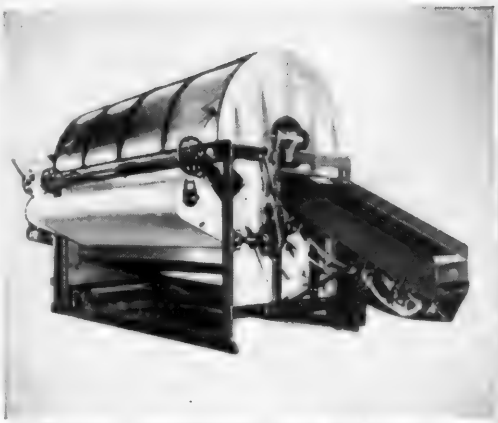
MR. J. TEDD, export sales manager of the Distillers Co., Ltd., has died after a long illness. Mr. Tedd, 44 years, leaves a widow and a 4-year-old son.

*

MR. L. H. TEARLE, chairman and managing director, Lawrence H. Tearle and Co., Ltd., has died at the age of 45. Mr. Tearle was at one time an executive at Leonard Hill, Ltd., and personal assistant to Mr. Leonard Hill. About twelve years ago he started a group of technical journals in South Africa and later opened a London office, from which he published *Grocery World* and *Handling International*.

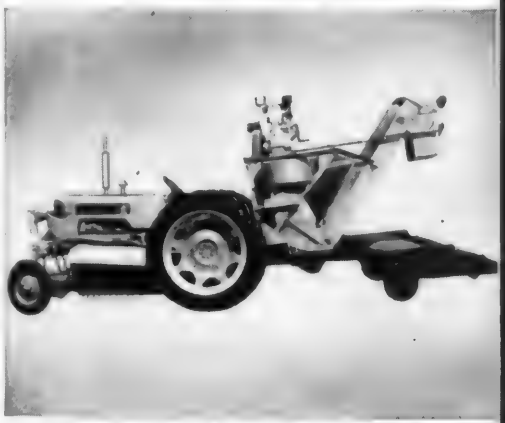
We extend our sympathy to his widow and five children. His widow (formerly Miss Joan Redhouse), was also for many years a valued employee of the Leonard Hill Group.

Long service awards were presented to members of Stokes and Dalton, Ltd., by Mr. Percy Dalton (third from left), *founder and chairman of the company. Many of those receiving presentations had served the firm since its early days. Mr. P. Dalton himself is shortly to receive a long-service award.*



CRCO Static Viners (Standard, Super and Taper Drum)

McBain Combine Harvester Viners



CRCO Dwarf Green Bean Harvester

Porter-way Pea, Spinach and Green Crop Harvester – loader

Harvesting Equipment

Mitchell Engineering Ltd., Food Machinery Division supply a wide range of harvesting equipment to the food processing industry.

MITCHELL

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OVERSEAS NEWS

AUSTRALIA

Milk production down

Australian milk production in 1960-61 is expected to be well below the record set in 1959-60, mainly as a result of unfavourable conditions in some major producing areas in the earlier part of the season.

The Bureau of Agricultural Economics, in a review of the dairy situation, states that production for the first seven months of the current season showed a decline of 7% compared with the corresponding period of last year and total milk production for 1960-61 may be down to 1,320 million gallons. With greater quantities of whole-milk required for human consumption, butter production will be considerably reduced, other usage showing little change. Factory production of butter during 1960-61 is expected to be 176,000 tons compared with 194,700 tons in 1959-60.

Total domestic consumption of butter shows little variation from 1959-60 so that the reduction in factory output will be reflected in a fall in the exportable surplus to about 62,000 tons. Exports in 1959-60 totalled 78,700 tons.

Milk production in 1959-60 was a record 1,409 million gallons, 3% higher than in 1958-59.

DOMINICAN REPUBLIC

Increased exports

A greater amount of food products was exported in 1960 than in any previous year. Food commodities accounted for 90% of the country's $180,362,000 exports.

CZECHOSLOVAKIA

Work on food standards for U.N.

The Czechoslovak Ministry of Agriculture, Forestry and Water Conservancy is to publish for the United Nations a study on standards for fruit and vegetables and methods of quality checking. The standards will be drawn up with a view to assisting international trade in such produce.

Publication of the study was decided upon during talks with officials of the secretariat of the U.N. Economic Commission for Europe. The meetings, held in Prague, were attended by Mr. H. Jacoby, director of the Commission's committee on agriculture; Mr. P. Grandjean, chairman of the international commission for standards in food products; and Dr. Stampach, Czechoslovak member of this same commission.

FRANCE

I.F.F. expansion

Insufficient space for expansion in their plants at Bois Colombes and Courbevoie has necessitated I.F.F.'s acquisition of a ten-acre site in Dijon for the building of a flavour plant.

GUATEMALA

Protein manufacture

Incaparina, a new protein and vitamin-rich food evolved by the Nutrition Institute for Central America and Panama, will be manufactured in two additional Central American countries. Contracts have been signed with manufacturers in El Salvador and Nicaragua, bringing the number of authorised producers to seven.

HOLLAND

Dyestuffs company formed

The Nederlandsche Kleurstof Industrie N.V. of Amersfoort, and Williams (Hounslow), Ltd., of Britain, have set up a new company under the name of Williams-Nedklind N.V. at Amersfoort. The company has begun the manufacture of high quality food dyes.

"Don't you know it's rude to put all that food on your fork at once?"

ITALY

Exhibition

The 16th International Show of Preserved Food, Preserved Food Packaging and Food Processing Plants at Parma is being held from September 20-30. The organisers are the Ente Autonomo Mostra Internazionale Conserve ed Imballaggi, Parco Ducale, Parma.

KENYA

Famine relief gift

A campaign waged voluntarily by British Forces in Kenya to help bring relief to famine-stricken areas was given a boost this week when the Leader of Government Business and Minister for Education presented a cheque for £10,000 to the Forces Famine Relief Fund on behalf of the Kenya Government. The money will be used to buy protein foods to supplement maize which was being issued in famine areas.

NEW ZEALAND

Milk consumption in 1960

Consumption of milk per head leads that in Australia. According to a recent report from Canberra, the *per capita* consumption of milk in Australia last year was 28½ gal. Figures supplied by the N.Z. Milk Board show that the average New Zealander drinks 32·8 gal. p.a.

Export butter challenge cup

After winning third place in both 1959 and 1960, the Amalgamated Co-op (Pahiatua), Ltd., went ahead to win the A.P.V. Challenge Cup this year. Levin Co-op Dairy Co., who won the Cup last year, were the runners up, and third place was taken by N.Z. Co-op Dairy Co. The 38 entries were shipped to England in specially marked boxes and judged by Mr. J. J. Walker, Inspector of Dairy Products, N.Z. Department of Agriculture, and his staff.

PERU

Tariff protection

The Compania Peruana de Alimentos Lacteos, a Nestlé subsidiary, has requested tariff protection for condensed, powdered and evaporated milk, and processed powdered milk for infant feeding. This last may be imported duty-free and the other categories are subject to very small import duties.

RHODESIA AND NYASALAND

Butter protection increase

Butter production in Southern Rhodesia rose in the past five years from 1,095,000 lb. p.a. to 2,361,000 lb. In Northern Rhodesia it went up from 25,000 lb. to 237,000 lb. In the same period, cheese production in the two Rhodesias increased from 2,539,000 lb. to 3,646,000 lb.

Bag manufacture

A £100,000 plant, for the Rhodesian Bag Manufacturing Co., started production in July of bags, pockets and sacks of all kinds, and protective clothing from imported hessian, calico and jute. A company official has stated that orders already in hand total 4 million bags. The company's capital has been supplied by British and South African interests.

SOUTH AFRICA

Citrus juice plant

A £450,000 citrus juice plant at Letaba in the Northern Transvaal has been erected by the Schlesinger Organisation. The plant is the first of its kind in the country and is capable of handling 150 tons of citrus a day.

Sugar production

Sugar mills are now in full operation for the 1961/62 season. By the end of May, 35,021 tons of sugar had been produced from 380,708 tons of cane. Local market sales during this period totalled 54,883 tons, which compares favourably with the 52,020 tons sold during May, 1960.

Technical Books

It is now five years since the retail book department of Leonard Hill Ltd. was opened.

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Import restriction on sweets

Imports of sweets, consisting mainly of the more expensive type of chocolate and specialities, have now been considerably restricted, and it is suggested that this fact may open up an additional market to local manufacturers.

SPAIN

Self-service store conversion

150 million pesetas have been made available to the Comisaria General de Abastecimientos y Transportes for granting loans to retail grocers to help finance the conversion of their shops to self-service stores.

TANGANYIKA

U.S. gift

The U.S. Government recently donated 300 tons of dried milk and 3,000 tons of maize, which would be distributed free in drought areas.

U.S.A.

Meat packing earnings

Net earnings of the meat packaging industry last year were estimated at $110 million on total sales of $13,250 million. The 1960 earnings were down 19% from $136 million in 1959, while sales were down only slightly from the $13,325 million total for 1959.

Australian venture

Corn Products International has reached an agreement with Clifford Love Starch Products Pty., of Australia, to furnish the latter with technical assistance.

Heinz purchase Pittsburgh firm

The H. J. Heinz Company have bought the 58-year-old firm of Hachmeister, Inc., manufacturers of baking ingredients for commercial bakeries.

Subsidiary company

A new subsidiary operation, FMC Argentina S.A., has been organised by Food Machinery and Chemical Corporation and plans for the construction of a manufacturing plant located on the outskirts of Cordoba, about 400 miles north-west of Buenos Aires, have been completed. Initially, FMC's Argentine operation are manufacturing fresh fruit and vegetable packing and processing equipment, agricultural power sprayers and dusters, selected items of food canning machinery, pumps and oil field surface control equipment.

OBITER DICTA

● I am informed that breakfast was invented about 1600.—*Letter in Daily Telegraph.*

● It would not be appropriate for me to give an opinion about quality, as this is so much a matter of individual taste.—*Mr. Christopher Soames.*

● One man may say that his glass is half empty, another that his is half full. It does not follow that the first is a pessimist and the latter an optimist. It depends on whether the glass contains wine or castor oil.—*Sir Norman Kipping.*

● I read with amusement the letters from the breakfast-eaters. Breakfast or nourishment of any kind is absolutely unnecessary until midday, whatever work is being done. No one can be in the best of health if he has to eat first thing in the morning.—*Letter in Daily Telegraph.*

● The following day the Field-Marshall the Viscount Montgomery of Alamein paid a 25 min. visit to the stand asking some searching questions, and after viewing some of the fresh produce packaging techniques commented that they reminded him of some conjuring tricks he had once seen.—*PPDA press release.*

● An attractive aspect of [Mr. Dunn's] idea that the Ministry of Education should recruit a corps of Ministry Enrolled Auxiliary Teachers (M.E.A.T.) is that the scheme, combined with the Minister's own, of Voluntary Enrolment of Graduates (V.E.G.) might at least provide the schools with nourishing fare.—*Letter in Daily Telegraph.*

● It is a cooler that can make the temperature of a solution go down from +35° to +2°C., and even till negative temperatures. With a flow of 600 litres per hour, this apparatus, between other originalities, is also moving, which makes its setting up easier and increases the possibility of work.—*Froid Informations.*

● In Scotland, apparently, portable milk bars can be had free on loan from the Milk Marketing Board, and are reckoned to be just the thing for a convivial gathering. Such milk bars have recently played a prominent part at the coming-out parties of two debutantes, and there have been enquiries from—of all unlikely people—the organiser of a regimental dinner.—*Food Topics.*

Recent Patents

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872,157. A. JOHNSON: Carton folding machine.
872,323. W. W. TRIGGS: Sausage and ground meat products manufacture.
872,391. DOMINION BREWERIES, LTD.: Continuous process for the production of beer.
872,491. P. J. EDMONDS: Washing machines for vegetables or other articles of food.
872,495. P. CROMBIE: Continuously operating tea withering, fermenting and firing machines.
872,497. BORDEN CO.: Can packing machine.
872,740. F. A. STANDEN AND SONS, LTD., AND P. STANDEN: Machines for use in topping beet and like crops.
872,721. GORDON JOHNSON EQUIPMENT CO.: Apparatus for removing feathers from plucking machines of poultry processing plants.
872,765. AMF-SASIB S.P.A. SCIPIONE INNOCENTI - BOLOGNA. Shredding machines.
872,801. A. B. ARENCO: Fish dressing machines.
873,145. OCEAN PRESERVING CO., LTD.: Cutting and slicing apparatus.
873,310. FISHER AND LUDLOW, LTD.: Pallets and stillages of the collapsible container type.
873,273. METAL BOX CO., LTD.: Containers.
873,337. PACKMAN MACHINERY, LTD.: Apparatus for handling biscuits and the like.
872,957. F. SCHNEIDER: Process for the purification of sugar juices.
872,958. F. SCHNEIDER: Process for the purification of sugar juices.
872,981. KORK-N-SEAL, LTD.: Caps for bottles and like containers and closure members for such caps.
873,288. W. E. AMIES AND CO., LTD.: Crates for bottles.
873,293. ARENCO, LTD., and E. J. LLOYD: Packaging machinery.
873,258. DIAMOND NATIONAL CORPORATION: Boxes and cartons.
873,098. MOREHOUSE INDUSTRIES INC.: Grinding mill.
873,099. T. L. SEABORNE: Relay pulsator for milking machines.
872,969. HEIN, LEHMANN AND CO. A.G.: Centrifuges.
873,476. A. SUNDRALINGAM and V. PERAMPALAM: Preservation of coconut milk.
873,698. IMPERIAL CHEMICAL INDUSTRIES, LTD.: Collapsible crate or like container with bottom discharge.
873,706. G. R. RHODES: Cartons and the like containers.
873,360. J. W. EARNSHAW. Means for filling containers with a pre-determined weight of liquid.
873,709. BOUCHER-GILES AND CO., LTD.: Tray or crate for storing meat.
873,580. RESEARCH ASSOCIATION OF BRITISH FLOUR-MILLERS, E. MCDERMOTT and J. PACE: Separation of starch and proteinaceous matter in wheaten flour and in maize flour.
873,681. W. E. LANHAM: Bread handling.
873,714. K. D. GOMM: Containers for dispensing liquid, semi-liquid and powdery substances.
873,715. LAKSO CO. INC.: Method and apparatus for packing partly filled necked containers.
873,684. KENWOOD MANUFACTURING (WOKING), LTD.: Food-mixing machines.
873,850. A. D. FOGLIE: Machine for shelling and sorting cashew nuts.
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873,654. NATIONAL DAIRY PRODUCTS CORPORATION: Packaging apparatus.
873,792. GENERAL FOODS CORPORATION: Process for producing a concentrated coffee extract.
874,228. W. D. MEAGHER and G. MEAGHER: Chocolate and like enrobing machines.
874,295. VILTER MANUFACTURING CO.: Flake ice-making machine.
874,537. UNILEVER, LTD.: Protein food products and their preparation.
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874,616. R. DIXON: Cartons.
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Little Tommy Tucker, Ltd. (690961.) 15, Gildredge Road, Eastbourne. Mnfrs of and dlrs. in confectionery, etc. Dirs.: D. E. C. Pyper; L. H. Hart.

Lyonpack, Ltd. (690963.) 12-13, Henrietta Street, London, W.C.2 Foodstuff packers. Subs.: J. Lyons; H. J. Marshall.

J. Skinner and Sons, Ltd. (691114.) 5, Leicester Road, Loughborough. Biscuit mnfrs., bakers, etc. Dirs.: J. F. Skinner; C. L. Skinner.

G. W. Field (1961), Ltd. (691403.) Edwards Lane, Speke, Liverpool, 19. Distillers of essential oils, makers of fruit and other flavouring essences, grinders of drugs, seeds and spices. Dirs.: C. H. Moors; C. T. Haines; J. T. B. Coulson; G. W. Williams.

H. and L. Rodol, Ltd. (691350.) 64-66, Camden High Street, London, N.W.1. Chocolate, sweet and ice cream makers. Dirs.: H. Rodol; L. Rodol; E. Rodol.

G. M. North, Ltd. (691694.) 29, Victoria Street, Grimsby. Mnfrs. and packers of and dlrs. in frozen foods, preserved and cooked foodstuffs. Dirs.: G. M. North; E. I. Reynard.

Sutch and Mott, Ltd. (691744.) 54, Cooden Sea Road, Bexhill-on-Sea, Sussex. Bakers, biscuit mnfrs., etc. Dirs.: D. W. Sutch; A. C. Mott; Mrs. Sutch; Mrs. Mott.

Thik Hai Products, Ltd. (692014.) 1a, High Street, Camberley, Surrey. Mnfrs. of and dlrs. in foodstuffs. Dirs.: V. E. R. Baness; D. Bowers.

Saturn Food Products, Ltd. (692100.) Foots Buildings, Preson, North Shields. Mnfrs. of and dlrs. in foodstuffs. Dirs.: T. Turnbull; J. Wedderburn; T. Turnbull, jr.; A. Turnbull; D. M. Sampson.

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Tyne Teas, Ltd. (693335.) Claremont Buildings, Eldon Place, Barras Bridge, Newcastle-upon-Tyne. Agents for, and importers, exporters, mnfrs. of and dlrs. in tea, etc. Dirs.: Margaret A. S. Stoddart and Dorothy Archer.

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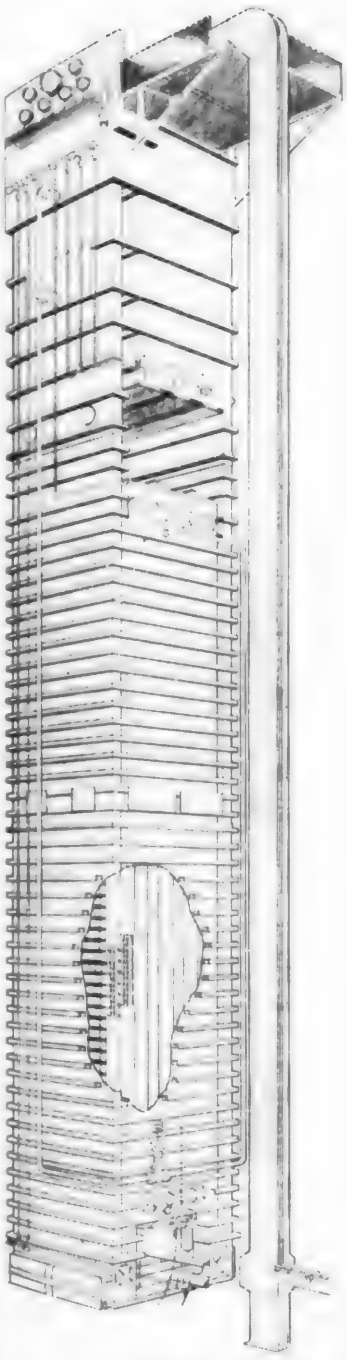

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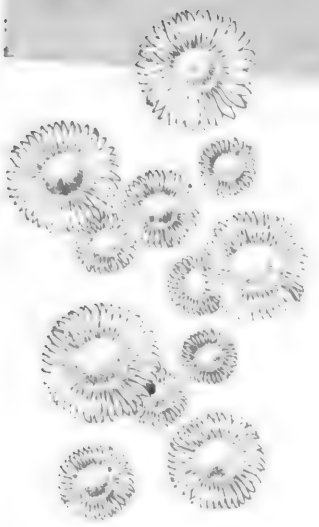

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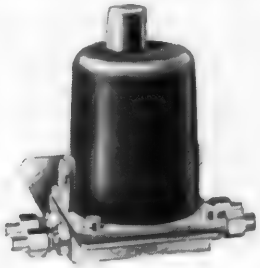

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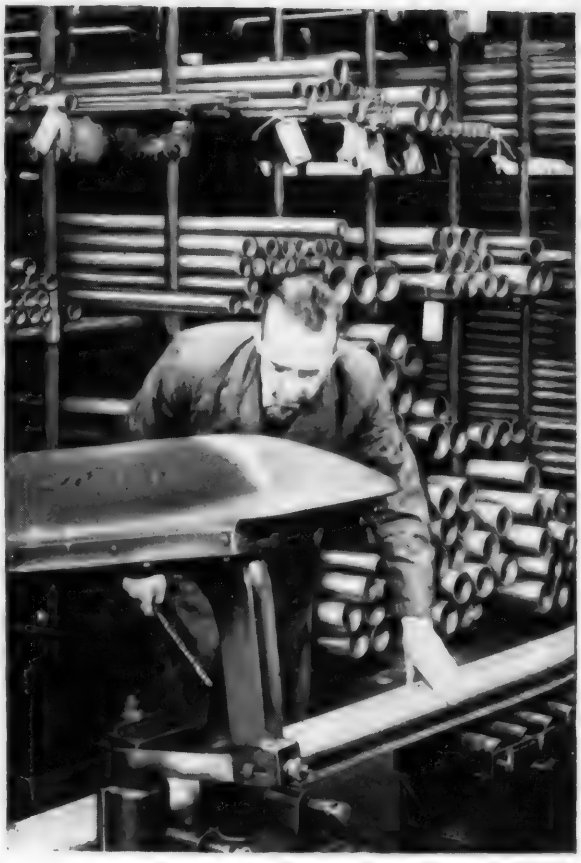

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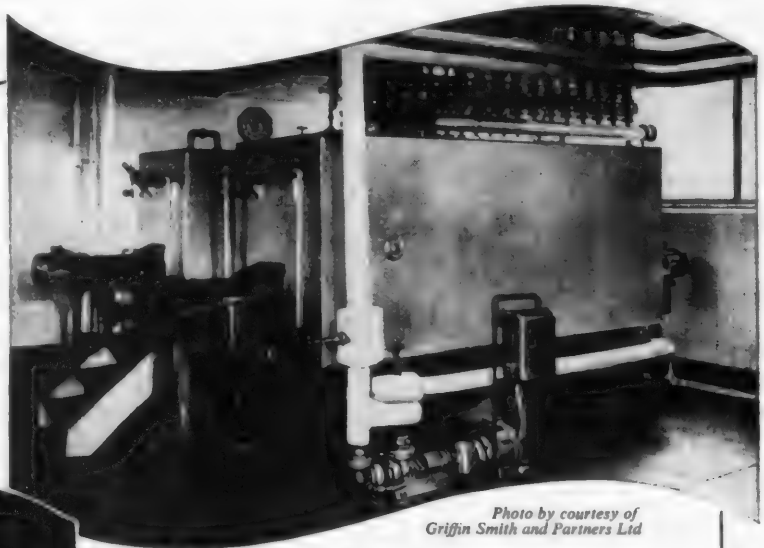

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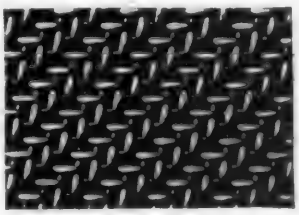

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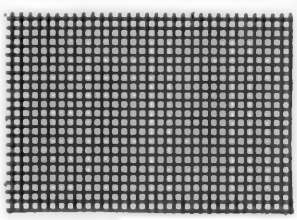

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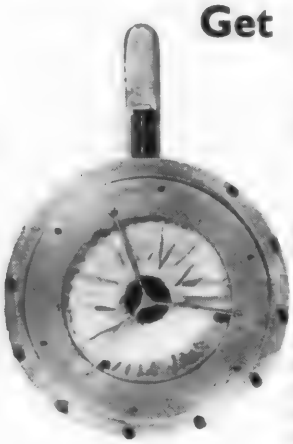

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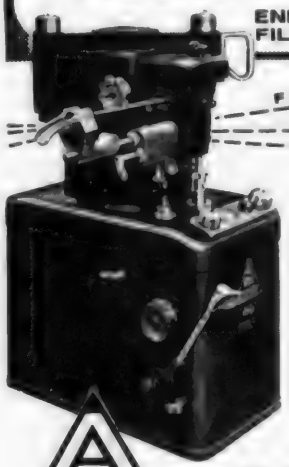

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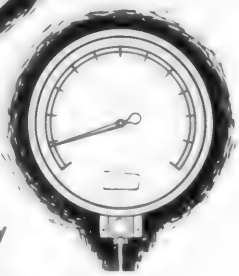

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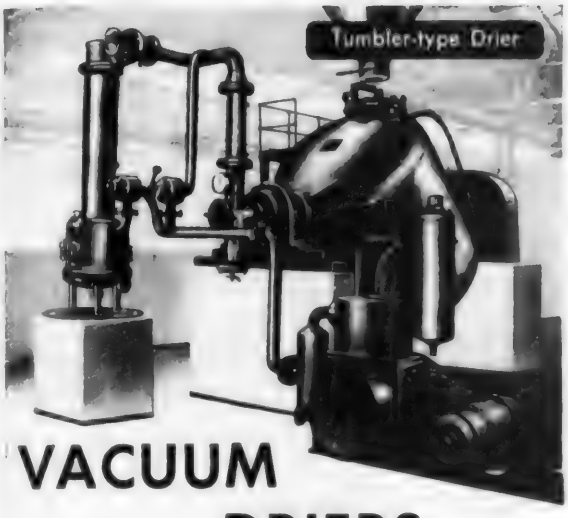

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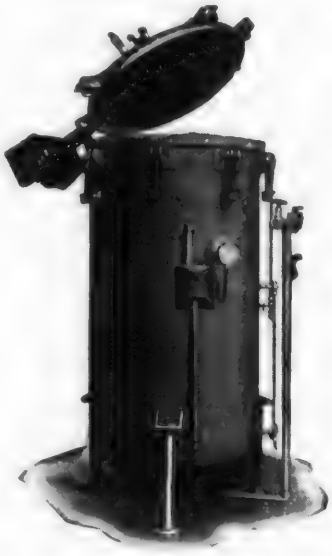

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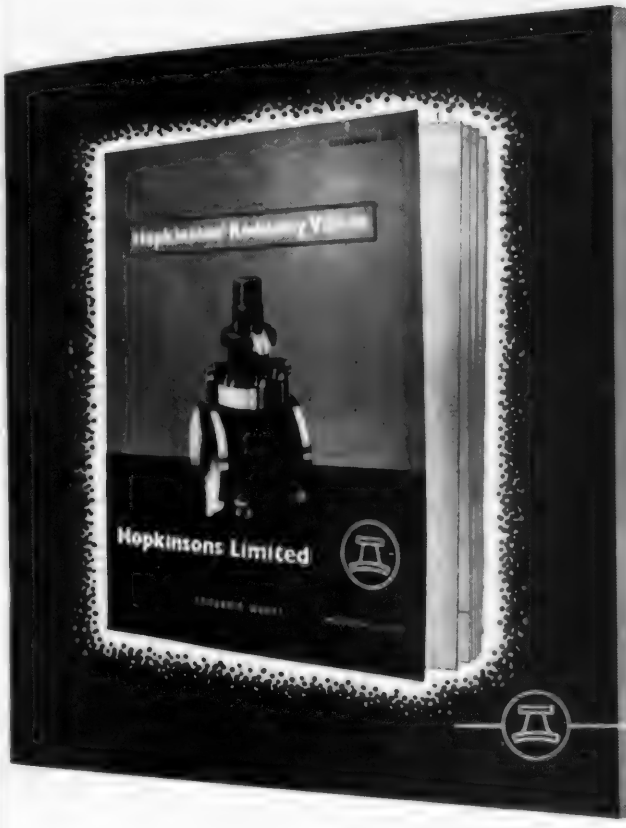

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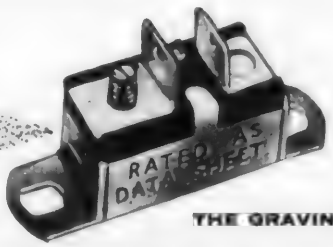

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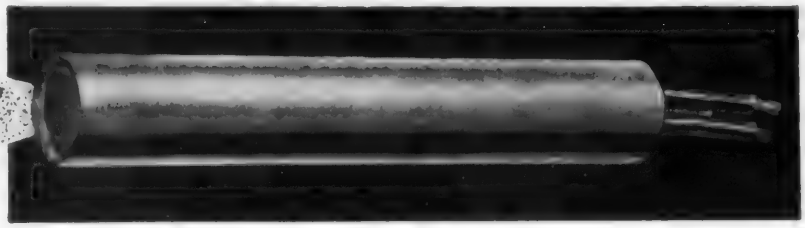

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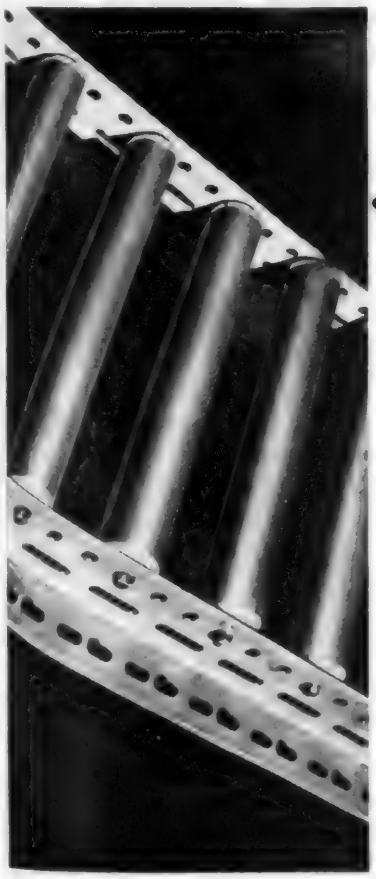

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Ref. B.504. British. Male. Single. Age 26. O.N.C. & H.N.C. Mech. & endorsements, G.I.Mech.E., Grad.I.E.D. 5 yrs. Apprentice, incldg. 2 yrs. in D.O., & 3½ yrs. D/man, designers & mnfrs. specialised aircraft equipt. At present Mech. Design Engr., mnfr. magnetic tape & specialised tape recording equipt. Seeks post with good prospects, pref. **DESIGN OR TECHNICAL REPRESENTATION.** Bucks. area pref. but elsewhere considered. £1,200 p.a.

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Ref. B.506. British. Male. Married. Age 29. B.Sc. (Chem.), D.I.C., Chem.Eng., A.R.I.C. 1 yr. Lab. Asst., organic chem. mnfr. 2 yrs. Research, atomic energy. At present Chem. Engr., fine chemicals & pharmaceuticals. Seeks post as **CHEM. ENGR., OR MANAGEMENT** appointment. £1,500 p.a. approx

(continued overleaf)

To: I.S.I.S. Appointments Register, 9, Eden Street, London, N.W.1. Please ask the following applicants to communicate with the undersigned:

Ref.:.....	**Ref.:**.....	**Ref.:**.....	**Ref.:**.....
Ref.:.....	**Ref.:**.....	**Ref.:**.....	**Ref.:**.....
Ref.:.....	**Ref.:**.....	**Ref.:**.....	**Ref.:**.....

Please use Block capitals

Name: .....

Position: .....

Company: .....

Business or Profession: .....

Address: .....

All introductions are made on the understanding that should an engagement result the employer agrees to I.S.I.S. Appointments Register's terms, which are as follows:

For each person engaged the equivalent of two weeks salary payable by the employer within fourteen days of the date of engagement.

Signature..... Date.....

I.S.I.S. APPOINTMENTS REGISTER *(Continued from overleaf)*

Ref. B.507. British. Male. Married. Age 24. O.N.C. (Mech.), C. & G. Workshop Practice, R.S.A. (1st Class). At present studying for H.N.C. 9 mnths. Lab. Asst., electronic navigational equipt. 4 yrs. Trainee, prototype elec. & mech. m/cs & equipt. At present Design D man, telecommunications equipt. & electronic components. Seeks **JUNR. MANAGEMENT TECH. REPRESENTATIVE DESIGN D MAN POST.** U.K., U.S.A. or New Zealand.

Ref. B.508. British. Male. Married. Age 29. A.C.E. 1st Class Nat. Cert. Elect. 1 yr. Devpt. Engr., electronic engrs. 2½ yrs. Senr. Design Engr., nucleonic engrs. At present Senr. Design Electronic Engr., nucleonic equipt. mnfr. Seeks post as **ELECTRONIC ENGR.** N. Rhodesia. £1,500 p.a.

Ref. B.509. British. Male. Married. Age 49. A.M.I.Plant.E. 12 yrs. Chief Engr., 2 yrs. Superintending Engr., 2 yrs. Genl. Manager & 1 yr. Advisory Engr., managing agents of industrial concerns abroad. Consid. exper. sugar & chem. industries, erection, commissioning & running of plant & mnfr. of sugar m/cy. Seeks post as **ENGR. OR MANAGER (EXECUTIVE).** London. £2,500 p.a. min.

Ref. B.510. British. Male. Married. Age 25. G.C.E. "A" level Pure & Applied Maths., O.N.C. Mech. Eng. & Elec. Eng. 5 yrs. Student Apprentice, armament mnfr. At present D/man, telephone transmission equipt. mnfr. Has passed A1 Elec. Eng. & now studying for A2. Seeks post as **ELECTRO MECH. ENGR.** U.K., not London. £780 p.a.

Ref. B.511. British. Male. Married. Age 38. Cert. & Diploma in Salesmanship. 10 yrs. Salesman, elec. supply industry. 1½ yrs. Sales Representative, elec. appliance mnfr. At present i/c Sales Office, elec. component mnfr. Seeks post as **SALES REPRESENTATIVE (ELEC.).** N. Kent area. £1,000 p.a.

Ref. B.512. British. Male. Married. Age 36. Ph.D., B.Sc. Physics with Chem. & Maths., B.Sc. 1st Class Gas Eng., Post. Grad. Dip. in Chem. Engg. 3½ yrs. Scientific Officer, industrial, research & consultancy. 3½ yrs. Senr. Engr., chem. engg. contractors. At present Director, engg. contractors to food industry, with responsibility for engg. prod. & certain sales of complete plants. Seeks post as **DIRECTOR GENL. MANAGER.** U.K., not London. £3,500 p.a.

Ref. B.514. Australian. Male. Single. Age 49. **RESIDENT U.K.** Dipl. Ing. (Civil), A.M.I.E. (Australia). 6½ yrs. Senr. Engr., harbour design & construction. 1½ yrs. Engr., railway bridge design & erection. 1 yr. Engr., factory & jetty design. 1 yr. Engr., power station design. 3 yrs. Engr., industrial buildings design. Seeks post as **CIVIL ENGR.** U.K., London pref., but provinces or abroad considered. £1,400 p.a. approx.

Ref. B.515. British. Male. Married. Age 38. O.N.C. & H.N.C. Mech., H.N.C. Prod. E., C. & G. 1st Class M/c Shop, A.M.I.C.E., A.M.I.Mech.E., M.I.Prod.E., M.I.W.S., A.M.I.W., A.M.I.Plant.E., A.I.Min.E. 4 yrs. Prod. Manager, engrs. 4 yrs. Maintenance Engr., mech. & civil projects. 4 yrs. Asst. Chief D/man, chem. plant mnfrs. 1 yr. Senr. Engr., devpt. division, mech. engrs. 8 yrs. Asst. Tech. Director, consultants. At present Senr. Engr., engine mnfrs. Seeks post as **ASST. CHIEF OR CHIEF ENGR. PROD. ENGR. MECH. ENGR. WORKS MANAGER.** England. £1,780 £2,250 p.a.

Ref. B.517. British. Male. Married. Age 23. Inter. C. & G. Workshop Eng., O.N.C. & H.N.C. Mech. Eng., S.I.Mech.E. 6 yrs. Apprenticeship & at present D/man, motor cars. Seeks post as **TEST ENGR. OR SIMILAR.** U.K., not London. £950 p.a.

Ref. B.518. British. Male. Married. Age 37. 9 yrs. Buyer, lampshade mnfrs. 3 yrs. Asst. to Man. Dir., printers. At present Industl. Buyer, mnfrs. Exper. in many markets for raw materials. Seeks post as **INDUSTL. BUYER.** U.K. £1,100 p.a.

Ref. B.519. British. Male. Married. Age 35. H.N.C. Mech. 3½ yrs. Pupil in toolroom & D.O., precision engrs. 1 yr. Junr. D/man, textile m/cy mnfrs. 5 yrs. Tool & Plant D/man, heavy engrs. 1 yr. Designer D/man, consulting engrs. At present Asst. Plant Engr., medium/heavy engrs. Exper. purchasing engg. equipt. & control of labour. Seeks **TECH. SALES OR ADMIN. POST IN PLANT ENGG.** U.K., provinces pref. £1,100 p.a. min.

Ref. B.522. British. Male. Single. Age 32. B.Eng. (Mech.), Indian University, Dip. Management Studies, A.M.I.Prod.E., Grad.I.Mech.E. 2 yrs. Graduate Apprentice & 6 mnths. Engr., power plant mnfrs. 6 mnths. Senr. Designer of automation equipt. & 2½ yrs. Senr. Designer of press tools, automobile mnfrs. 1½ yrs. Methods Engr., automobile accessories. At present Senr. Prod. Engr., camera mnfrs. Exper. costs & budgetary control. Seeks post as **PROD. ENGR. OR MANAGER.** U.K. or Canada. £1,350 p.a.

Ref. B.523. British. Male. Married. Age 25. Studying for O.N.C. 2 yrs. Lab. Asst., road materials laboratory. 2 yrs. Lab. Asst., asphalt & mastic mnfrs. 1 yr. Control Chemist, asphalt & macadam mnfrs. 1½ yrs. Lab. Asst., new town authority. At present Senr. Lab. Asst. (road & bldg. materials), civil & mech. engrs. Consid. exper. testing all types bituminous road surfacings, concrete, bldg. materials, tars & of soil mechanics. Seeks post as **SENR. LAB. ASST.** U.K. £850 p.a.

Ref. B.524. British. Male. Single. Age 23. Cert. in Journalism. 1 yr. Mech. Engg. Apprentice, motor car mnfr. At present Journalist, newspaper publisher. Seeks **PUBLIC RELATIONS POST.** N. Home Counties. £15 per week min.

Ref. B.525. British. Male. Married. Age 29. H.N.C. Mech., Grad.I.E.D. 2 yrs. clerical work, genl. engg. 1 yr. Junr. D/man, safe load mechanisms for cranes. At present Senr. D/man, hydraulic & pneumatic test gear for guided missiles. Seeks post as **DESIGN D MAN.** U.K. £1,100 p.a.

Ref. B.526. British. Male. Married. Age 39. 1st & 2nd yr. O.N.C. Mech. 4 yrs. M/c Setter, precision toolmakers. 11 yrs. Design Engr., instrument engrs. 6 yrs. Section Leader & Asst. Chief D man, electronic engrs. 2 yrs. Section Leader, electronic engrs. At present Designer, control systems & instrument engrs. Seeks post as **TECH. SALES PROJECT LIAISON ENGR.** Berkshire area. £1,200 p.a. approx.

Ref. B.528. British. Male. Married. Age 29. R.N. Apprenticeship. Qualifies I.C.Es. & Refrigeration. 12 yrs. R.N. & at present C.P.O., retiring September. Consid. exper. operation & maintenance of turbo & recip. m/cy, I.C.Es. & refrig. Seeks post as **SERVICING MAINTENANCE REFRIG. ENGR.** S. England pref. but anywhere considered. £900-£1,000 p.a.

Ref. B.529. British. Male. Married. Age 35. Govt. Training Course (Draughting). 6 mnths. D/man, electric appliance mnfr. At present Senr. Aircraft D/man, aircraft mnfr. Good exper. hydraulics, engine instlln., fire protection & structure, i.c. engines, motor vehicles, industl. electrics. Seeks post as **TECH. REPRESENTATIVE.** N. England, Yorkshire pref. £1,000 p.a.

Ref. B.530. British. Male. Married. Age 25. 3½ yrs. Plumber's Mate, sanitary engr. 2½ yrs. Plumber, bldrs. At present Plumber, maintenance for new town. Knowledge most bldg. trades, & their tools & materials. Seeks post as **BUILDERS REPRESENTATIVE.** U.K., not London.

Ref. B.531. British. Male. Single. Age 27. H.N.C. Applied Physics. Studying for Grad.Inst. Physics. 3 yrs. Lab. Asst., chem. research. 4½ yrs. Lab. Technician/Asst. Physicist, radio valve mnfr. At present Asst. Physicist, mnfr. electronic valves & devices. Seeks **TECHNICAL/SUPERVISORY POST.** Anywhere. £1,100 p.a.

Ref. B.532. British. Male. Married. Age 28. Studying for Lic. of Inst. of Metallurgists. 3 yrs. Metal Finishing Section Leader, metallurgical laboratories. At present Asst. to Chief Metal Finishing Chemist, mnfrs. Exper. formulation of new processes, investigation of new processes, plant layout, design & instlln., effluent treatment, costing, electro-plating, metallography & metallurgical analysist. Seeks post as **METAL FINISHING CHEMIST METALLURGIST** or similar. U.K. £1,200 p.a. min.

Ref. B.533. British. Male. Married. Age 45. B.Sc. Chem., A.R.I.C., A.M.I.Chem.E., Dip. in Chem. Eng. 9 yrs. plant investigation work, prod. of non-ferrous metals & heavy chemicals. 2 yrs. Tech Asst., chem. eng. contractors. 2 yrs. Devpt. Engr. for new schemes, chem. industry. 2 yrs. Tech. Sales work, acid resisting constructions. 2 yrs. Chem. Works Superintendnet, heavy chem. & fertiliser prod. At present Tech. Sales & Project Engr., chem. engg. contractors. Seeks **EXECUTIVE APPOINTMENT** in Prod. Devpt. or Contracting. S. England or abroad. £2,750 p.a.

Ref. B.534. British. Male. Single. Age 23. H.N.C. Mech. Eng., G.I.Mech.E. 5 yrs. Technician Apprentice, elec. equipt. mnfrs. At present Jig & Tool Design D/man, elec. equipt. mnfrs. Exper. design & devpt. special purpose m/cy. Seeks post as **DEVPT. ENGR.** S. Coast England. £900 p.a.

Ref. B.535. British. Male. Married. Age 35. 11 yrs. Chargehand/Asst. Foreman, elec. engg. At present Electronic Planning Engr., electronic automation (nuclear). Exper. Prototype & Small Batch Prod. & supervision male & female labour. Seeks post as **PROD. MANAGER.** London. £1,500 p.a.

Ref. B.536. British. Male. Married. Age 33. O.N.C., H.N.C. Industl. Admin. 5 yrs. Eng. Apprentice & 3 yrs. D/man, engrs. & crane makers. 2½ yrs. Control of D.O. & Estimating Offices/Works Manager, genl. engrs. 4 yrs. Senr. Project Engr., consultant engrs. At present Senr. Project Engr., consultant engrs. Seeks **MANAGERIAL POST.** London/Camberley/Woking/Farnborough areas. £2,000 p.a.

Ref. B.537. British. Male. Single. Age 26. Agric. Diploma. 2½ yrs. Asst., farmer. 1 yr. Self-employed, farm. At present Representative, agric. m/cy agent. Seeks post as **MNFRS. REPRESENTATIVE.** U.K., not London. £700 p.a. min.

Ref. B.538. Indian. Male. Single. Age 22. **RESIDENT U.K.** B.Sc. (India). 1 yr. Supervisor, mineral supplier. Seeks post as **LAB. ASST.** London. £11 per week.

Ref. B.539. British. Male. Married. Age 55. B.Sc. (1st Class Chem.), Ph.D., M.I.Chem.E., F.R.I.C., M.Inst.F. 8 yrs. Research Dept. Plant Manager, chem. mnfr. 3 yrs. Research Manager, low temperature carbonisation. 5 yrs. Asst. to Director of Research, aluminium & magnesium prod. At present Technical Adviser, mnfrs. chemicals & other products, with exper. liaison between company's research laboratories & overseas dept., establishment new processes & factories in U.K., U.S.A. & S. Africa, commercial assessment of new processes, initiation & devpt. of wood pulp project abroad, technico-economic studies of petrochemicals & derived plastics, fibres & other products, world survey of new fibres. Seeks **TECHNICAL MANAGEMENT OR ADMINISTRATION POST.** London or Outer London (N). £2,500 p.a.

Ref. B.540. British. Male. Married. Age 35. H.N.C. Mech. Eng., A.M.I.Mech.E. 5 yrs. Designer D/man, genl. engrs. 3 yrs. Mech. Engr. responsible for devpt. of precision engg. projects, precision engrs. At present Chief Engr., food mnfr. Exper. architectural negotiations. Seeks **EXECUTIVE POST**—any industry requiring application of engg. principles in broadest sense. S. England, pref. West country. £2,000 p.a.

Ref. B.541. British. Male. Single. Age 26. B.Sc. (Civil Eng.), Grad.I.C.E. At present Civil Engr., engaged in tender design, civil engg. contractors. Seeks **MANAGEMENT POST.** U.K. £1,200 p.a.

Ref. B.542. Indian. Male. Single. Age 26. **RESIDENT U.K.** B.Sc., Dip. in Mech. & Elec. Engg. 4 yrs. Engg. Apprentice with D.O. exper., genl. mech. engrs. 2 yrs. Engg. Asst., mech. engrs. 10 mnths. Design Trainee, hydraulic presses, Germany. Seeks post appropriate to exper. London. £1,000 p.a. approx.

Ref. B.543. British. Male. Single. Age 26. H.N.C. Mech. Eng., Grad.I.Mech.E. 5 yrs. Applications Engr./Sales Engr., process control mnfr. At present Senr. Engr., process control mnfr. Seeks post as **SENR. PROCESS CONTROL INSTRUMENT ENGR.**, or **SENR. POST IN TECH. SALES OR SALES ADMINISTRATION DEPT.** Greater London, Home Counties or West Country. £1,400/£1,500 p.a.

Ref. B.544. British. Male. Married. Age 45. A.M.B.I.M., A.M.I.M.I., M.Inst.PS. 4 yrs. Junr. Clerk/Cashier i/c agency, banking. 19 yrs. Army, Lt.-Col. At present Asst. to Manager, Staff & Labour Relations, iron & steel mnfrs. Consid. exper. transport operation & administration. **SEEKS PERSONNEL OR TRANSPORT MANAGEMENT POST.** U.K. pref., but overseas considered if not on contract. £1,750 p.a. approx.

Ref. B.545. British. Male. Married. Age 29. B.Sc., M.Sc. 1 yr. Genl. Worker, glasshouse nursery. 6 mnths. Genl. Worker, glasshouse & coldframe prod. At present Specialist Officer (Horticulture), ministry of agric., abroad. 2 yrs. Postgrad. work connected with horticultural research. Exper. investigations tropical tree-crop nursery & field work. Seeks **HORTICULTURAL ADVISORY OR RESEARCH POST.** U.K. £900 p.a.

Ref. B.546. British. Male. Single. Age 26. Studying for H.N.C. Elec. 6 yrs. Apprentice, electronic equipt. mnfrs. At present Tech. Sales Engr., process control/instrument mnfr. Exper. electronic & pneumatic systems of control engg. in petroleum, chem. & power industries. Seeks **TECHNICAL SALES/LIAISON POST** or similar. London.

Ref. B.547. British. Male. Married. Age 35. O.N.C. Mech. Eng., O.N.C. Prod. Eng., H.N.C. Mech. Eng., A.M.I.Mech.E., A.F.R.Ae.S. 3 yrs. Tech. Asst., design & devpt. combustion systems. 6½ yrs. Senr. Engr., design & devpt. turbine control systems & accessories. 1½ yrs. Deputy to Chief Engr., high altitude test plant for turbines. At present Chief Designer, mnfr. aero & industl. gas turbines. Exper. contract negotiation, tendering, budget control, prod. & process planning, market research, staff selection, apprentice training. Seeks post as **TECH. MANAGER OR CHIEF ENGR.** (light/medium mech. engg.). U.K., not London, Europe or New Zealand. £2,000 p.a. min.

Ref. B.548. British. Male. Married. Age 29. O.N.C. Mech. Eng. & now studying for H.N.C. 6 yrs. Apprentice, railway carriage heating & lighting. 5 yrs. Mech. D/man, prod. of packaged steam generators. At present Senr. Mech. Design D/man, special engg. & nuclear engg. Seeks post as **TECH. REPRESENTATIVE.** London or S. Counties. £1,000 £1,100 p.a.

Ref. B.549. British. Male. Single. Age 30. H.N.C. Mech. 5½ yrs. Apprentice Fitter & Turner, engrs. & boilermakers. 1 yr. D/man, plastics moulders & fabricators. 3 yrs. D/man, paper m/cy mnfrs. At present Designer D/man, nuclear & special plant & m/cy, incldg. pressure vessels. Seeks post as **DEVPT. ENGR.** £1,200 p.a. min.

Ref. B.561. British. Male. Married. Age 25. O.N.C. Elec., H.N.C. Mech. (5 endorsements), H.N.C. Prod., G.I.Mech., Grad.I.Prod.E. 6 yrs. Student Apprentice & at present Technical Assistant, govt. ordnance factory. Seeks post as Asst. to **WORKS MANAGER PROD. MANAGER, OR SIMILAR** or post I/C **SMALL PROD. UNIT.** £1,100 p.a.

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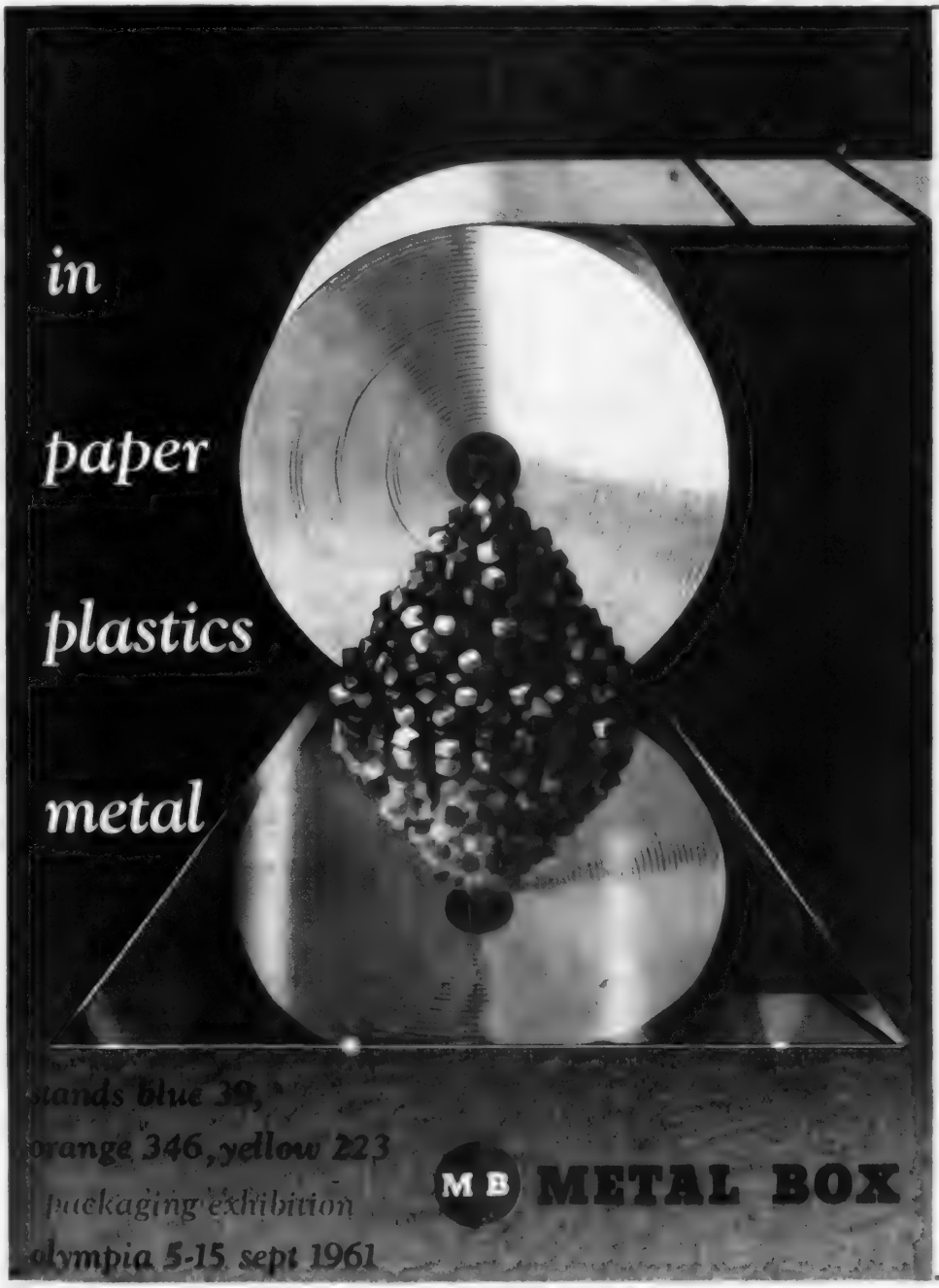

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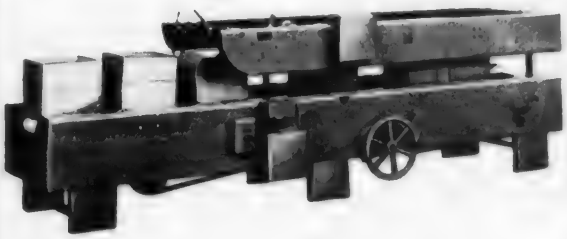

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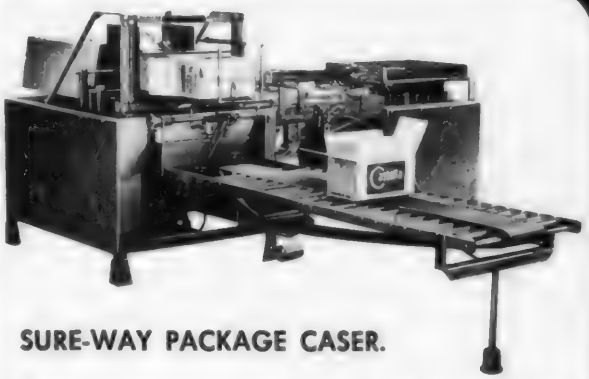

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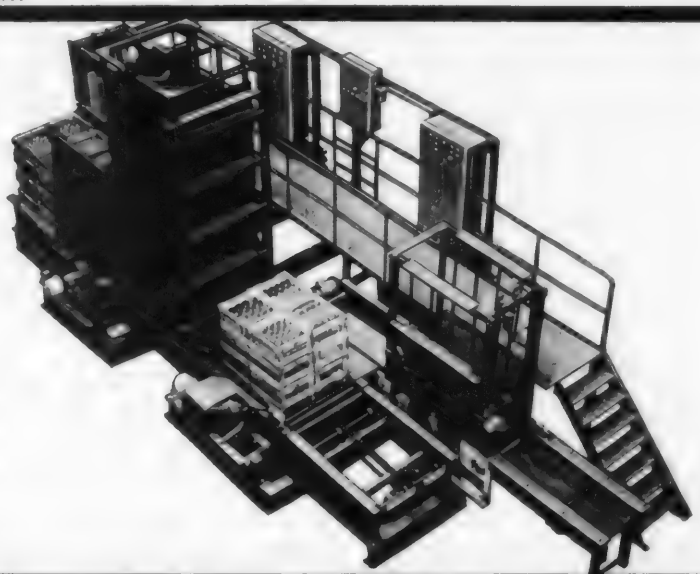

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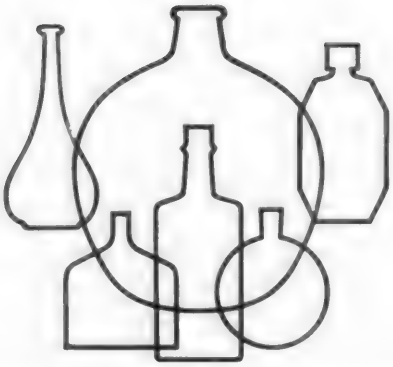

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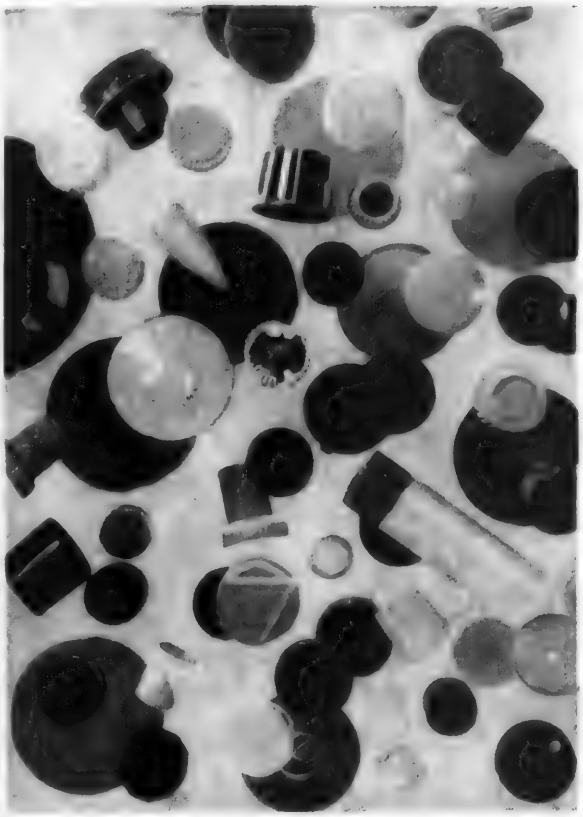

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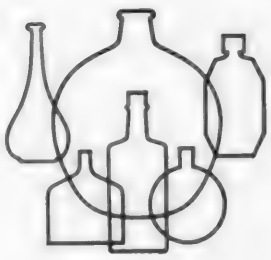

UNITED GLASS LTD. KORK-N-SEAL LTD.
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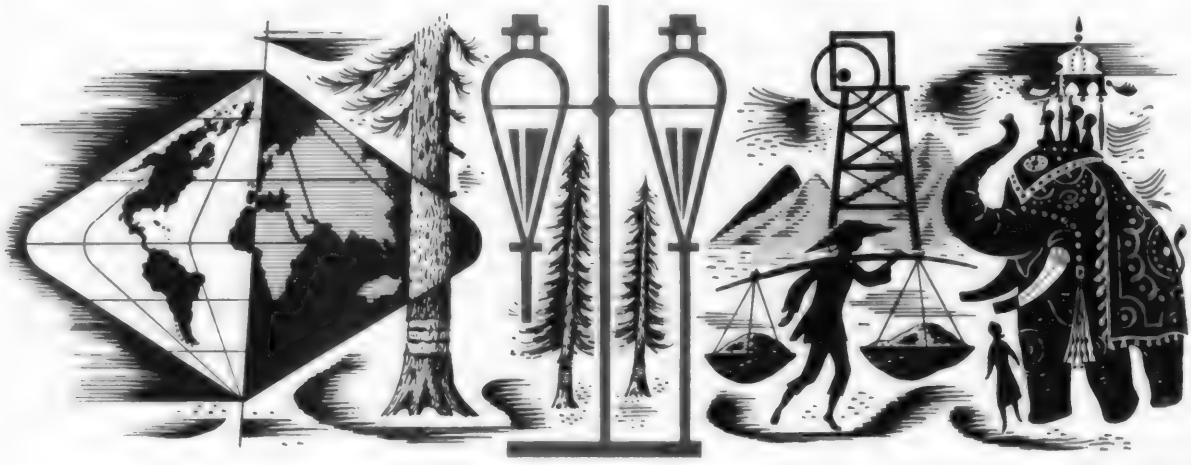
sales appeal from the 4 corners



In the world's remote forests, lodes and valleys lies tomorrow's sales appeal. The four corners yield the ingredients of printing inks. Cobalt, tung oil, molybdenum. Shellac, chrome and tungsten. Destined, with a host of others, for Coates' modern factories.

Without printing inks, the supermarkets and the stores could have little sales appeal. Without Coates, modern packaging would be the poorer.

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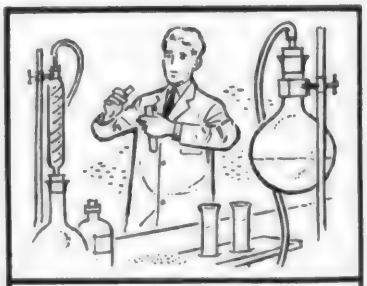
Coates make inks, sold throughout the world, for every printing process.



COATES PRINTING INKS

COATES BROTHERS INKS LTD, Easton Street Rosebery Avenue London WC1 have factories at St. Mary Cray (Kent), Manchester, Glasgow, Liverpool, Birmingham, Leeds, Newcastle and Dublin. Oversea companies operate factories in South Africa, Central Africa, East Africa, Australia, New Zealand, India and Singapore.

Colour in Packaging

By Faber Birren and E. P. Danger

Faber Birren is a colour research consultant in the U.S.A. who is retained by a number of well-known firms to advise on colour problems in packaging. In this article he and his co-author state the factors which must be considered in designing the colours of a package and say that colour research can lighten the load of the package designer.

THE consumer is left more and more to his or her own devices and therefore retail selling is becoming increasingly a matter of impulse. In the U.S.A. as many as 60% of purchases are made on impulse. Hence the importance of the package and in the overall design of the package colour plays a vital part.

6 points of package design

The following 6 points illustrate the objectives to be aimed at in package design and colour:

1. The package must command the eye and here colour is vital.

2. The package must establish its identity and here typography and design are important.

3. The design and colour scheme must be appropriate to the product.

4. The package must be pleasing to the eye. A package that catches the eye and is also pleasing is better than one that has only one of these attributes.

5. The package must invite handling—and purchase.

6. The package must be well made and do its job properly.

The first essential is that the package should command the eye. Vision is in the brain as well as in the eye. The eye is primarily a lens and not only must it record images, but the brain must also make sense of what is seen. This is where colour is so important; it has an effect on the mind and on the senses, but the image registered on the brain is greatly affected by the conditions under which the eye records the image.

The eye has different sensitivity under different conditions of illumination. When the eye is adapted to light the colour spectrum is brightest at yellow. When the eye is adapted to dark the spectrum is brightest at blue-green and red may fade into blackness. In general, however, red is the most easily visible colour, but in certain conditions blue can be seen over a wider range of vision than red.

Background in display is important

This is probably of little importance in most merchandising situations, but when all colours are seen in the same light yellow has the highest visibility. But background is vital. White is a good background but lacks attention value and some other combination may be called for.

Black on yellow makes a very legible combination but it can be very trying in bulk and would build up a strong after image of blue which might be very displeasing. Red and yellow are the best attention getters, but due consideration must be paid to their relative appeal and beauty and to other effects that they may have.

There are other considerations as well. Red, for example, normally focuses at a point behind the retina of the eye and makes articles appear larger. Blue tends to have the opposite effect. Blue will tend to appear blurred at a distance, while red and yellow will stand out clearly. Other colours will have their own specific effects.

Size is accentuated by the use of light, warm colours, but these may not be the best in all circumstances. Similarly elements in a design which are meant to stand out should be in red, yellow or orange, and preferably set off against a greenish, purplish or bluish background of low value, but particularly with foodstuffs these may not be the best colours from a psychological point of view.

Practically everyone is sensitive to the colour of food. The rich red of the apple or rare cut of beef is very appealing, and so is green. Yellow-green has the opposite effect, and blue is not very appealing in a food, nor is violet or purple. Tints as a rule are not as attractive as basic colours, but the shade of orange is associated with good food. Shades of red tend to be purplish and therefore unattractive.

Great care must therefore be taken in using colour for foodstuff packs in ensuring that the colours reflect the merchandise inside. However good a food may be people will not buy it if the colour is wrong and does not fit in with their idea of what the colour should be, and these ideas must be followed through in packaging. The writer recently had occasion to carry out some consumer tests on a new foodstuff in a blue pack.

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them
MXXT/A
"CELLOPHANE" FILM
gauge for gauge
BCL
BRITISH CELLOPHANE LIMITED
HENRIETTA HOUSE
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THE MOST MOISTUREPROOF PACKAGING FILM
IN THE WORLD

"Rescue"—a design from the studios of the Metal Box Company, Ltd. (All colour illustrations by courtesy of the Metal Box Co.).

The food was confectionery and almost all consumers were agreed that they did not like the blue packs. There was a much higher proportion of acceptance of the product in a different coloured pack.

After image

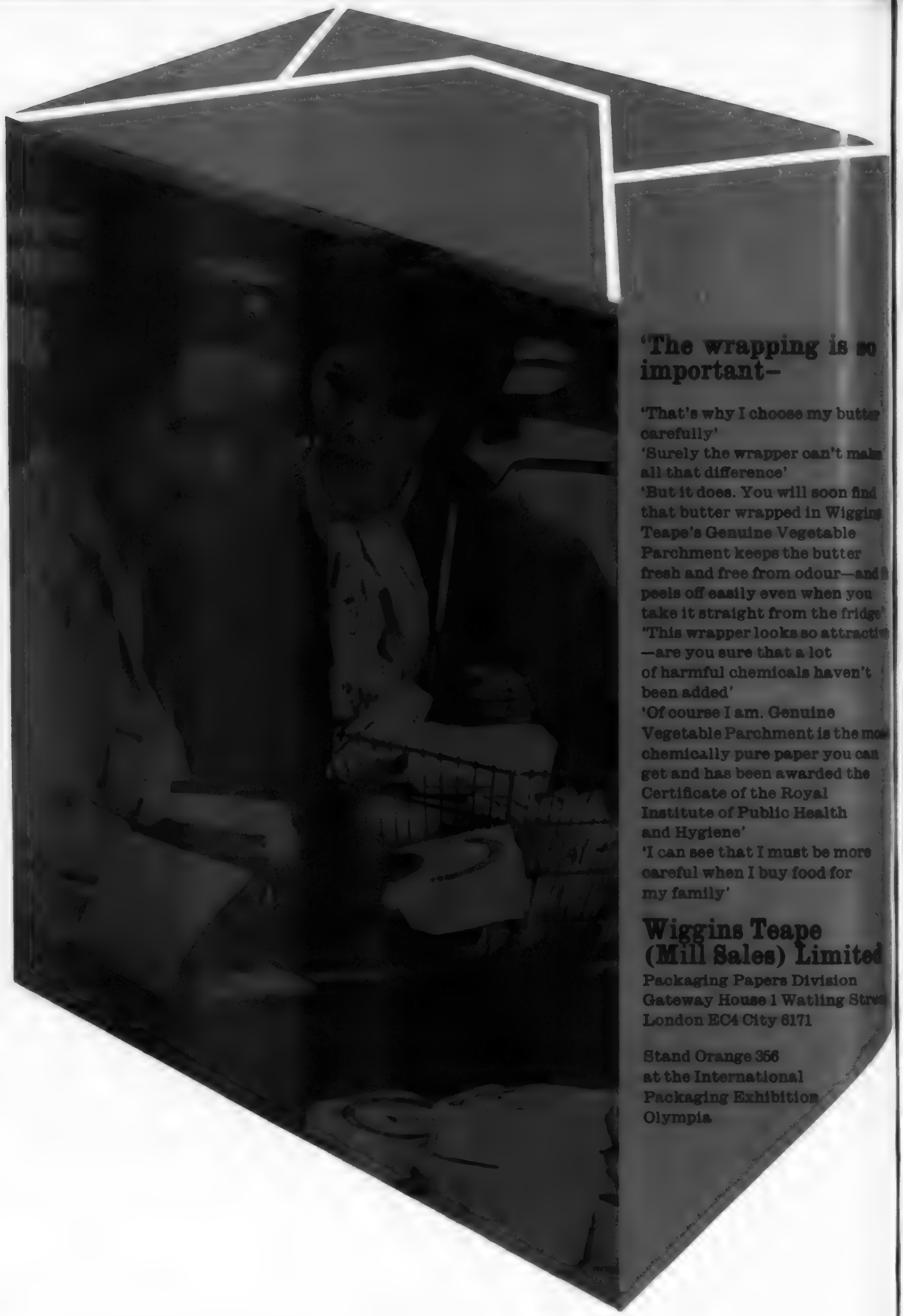
Stimulation of the eye by one colour will bring forth an after image of the complement. After looking at red the eye will experience a sensation of green, and where red and yellow are used together, the green after image of the red will tend to make the yellow have a lemon tint. Likewise the blue after image of the yellow may make the red purplish, depending on the relative size of the areas. An otherwise attractive colour may be quite spoilt because the after image of another part of the design alters the visual character of the shade. On the other hand, advantage can be taken of these after images with proper planning.

Brightness will be accentuated by darkness. White looks whiter on black than it does on grey. All these phenomena can be planned for maximum effect, but great care is necessary that lack of thought will not cause a bad effect.

Due thought must be given to the class of market to which the package is designed to appeal. The mass market in general tends to like brighter and simpler colours than the more sophisticated market, and a product that sells on "snob" appeal would need quite different colours to the package designed to appeal to the cheaper end of the trade.

Certain colours have fixed associations in the mind of the public. Green is not generally considered suitable for children's articles. Sweets in assorted colours will sell better than sweets in one colour alone. Certain colours are associated with the spring. People will not buy bread other than white or brown (blue bread has been tried). The list could be continued indefinitely.

In displays associated with the packaging, somewhat different criteria must be used. Although the same factors are present, i.e. simplicity, high visibility and attention value, the function of the display is different to that of the



'The wrapping is so important–

'That's why I choose my butter carefully'
'Surely the wrapper can't make all that difference'
'But it does. You will soon find that butter wrapped in Wiggins Teape's Genuine Vegetable Parchment keeps the butter fresh and free from odour—and it peels off easily even when you take it straight from the fridge'
'This wrapper looks so attractive —are you sure that a lot of harmful chemicals haven't been added'
'Of course I am. Genuine Vegetable Parchment is the most chemically pure paper you can get and has been awarded the Certificate of the Royal Institute of Public Health and Hygiene'
'I can see that I must be more careful when I buy food for my family'

Wiggins Teape (Mill Sales) Limited
Packaging Papers Division
Gateway House 1 Watling Street
London EC4 City 6171

Stand Orange 366
at the International
Packaging Exhibition
Olympia

packaging, and greater use must be made of contrasts of various kinds.

POINTS IN COLOUR DESIGN

In planning the colour of a package the following are some of the main factors that the colour researcher and ultimately the package designer must consider:

1. The extent to which it is necessary to retain an existing design in order to maintain the company image.

2. The colours used in an existing range of packs, and the extent to which they form a coherent whole. Some variety may be advisable.

3. The extent to which the colours used in individual packs are complementary or otherwise.

4. Whether the colours used are acceptable to the consumer in the markets for which they are intended.

5. The extent to which the packs may clash with, or be overshadowed by, other packs on the market.

6. Whether the colours used have sufficient impact to ensure consumer choice in the conditions under which they are sold, e.g. self service store, supermarket, freezer cabinets and the like.

7. Whether the colours used have maximum impact under the lighting conditions common in modern stores.

8. Whether the colours used fit in with the traditional views of consumers, especially about food colours. For example, too light a green for peas might connote preservatives in the mind of the public and so might too bright a green. A different shade might well have more effect in promoting a "garden fresh" image.

9. The extent to which colour can, or should, be used to impress a brand image on the consumer, and the extent to which this may be repeated in display and advertising.

10. The extent to which the colours used on the outside of the package match the colours of the contents, and whether any alteration is required to obtain greater attraction.

11. The extent to which colour effects the cost of the package, and whether improvements can be made.

12. The general acceptability of the pack to the consumer and retailer.

13. The extent to which the package may be aggressive and tend to dominate a display. A dominant package may be monotonous and actually enhance the appearance of other packs. It may invite the customer to try something different.

14. One dominant colour may be a mistake. It may be a good idea to vary packs where possible by using a slightly different combination for different types of contents without sacrificing the brand image.

15. Sharp contrasts in light and dark may make the package difficult to "grasp" in a display and may break it up into small parts which give the wrong effect.

16. Instantaneous impressions must be simple and direct where impulse buying is concerned. The package should have a unity which ties in with the reproduction of the product.

17. Elements in the design may be too sharp and severe and especially with packages that are purchased by women, this must be toned down.

18. The package should have (a) clear unity, (b) be unmistakeably identified with the makers, (c) be co-ordinated and pleasing in colour, (d) have the product description distinct and related from pack to pack for ease of selection.

It will be noted that these remarks refer to existing packs but, of course, if the pack is a new one these considerations would equally be taken into account in planning the initial design.

The list given above is not necessarily exhaustive and other considerations will arise in individual cases.

Package colour needs more attention

Because colour plays an increasingly important part in packaging, particularly for consumer goods sold in self service stores and the like where impulse buying is important, it is essential that much greater attention should be paid to the colour make-up of the package. It is also essential to ensure that the colours chosen, the shades and the proportions help the sales effort and do not hinder it.

Designers on the whole tend to choose those colours which reflect their personal preferences and artistic sense, and the better the designer the more highly sophisticated his taste is likely to be. These sophisticated colours do not necessarily appeal to the mass market or have the greatest sales impact.

The design itself may be perfect on all counts but it still may not have the highest possible sales impact if the colours are not right. The designer may tend to be biased in favour of his own design and may not therefore detect trends which are affecting consumer choice of colour. This is perfectly natural and does not in any way reflect on the competence of the designer.

It is the function of colour research to investigate all possible angles and to correlate these with scientific knowledge of colour in all its aspects—psychological, ophthalmic and, in some cases, medical. The whole provides data which is of considerable value to the designer and which provides a check on existing thinking. Colour research is unbiased and can therefore be used to evaluate existing designs from the colour standpoint and thus bring a new view point to bear.

Colour research can lift the load

By using a colour research organisation it is possible to ensure a coherent policy with regard to colour, irrespective of the designer's use, but it should be emphasised that colour research does not take the place of the designer. It aims to co-operate with him, but its most important function is to

"Patio"—a design from the studios of the Metal Box Company, Ltd.

assist management by providing them with data on which decisions can be reached and by eliminating personal preferences.

Evaluation of a pack

How does a colour researcher set about evaluating an existing pack or study the colour factors involved in designing a new one? A typical study would take the following course:

1. The pack colours are critically analysed and tests devised to improve their impact.

2. The appearance and visibility of the pack is tested with various combinations of colours and optical measurements made of visibility, legibility, size, shape and perception.

3. Comparative drawing power of various colour combinations is tested under point-of-sale lighting conditions.

4. The package is compared with competitive packages.

5. Psychological factors involved are considered. This would include the relation of the package colour with the food inside. The colour must indicate the contents correctly and incongruous colour associations must be eliminated.

6. Tests are made to establish which colours give the best appearance to the pack. Red has a tendency to accentuate size, while blue has the opposite effect. Due attention must be paid to colour contrast; a preponderance of one colour might lead to an unsatisfactory after image.

7. Suitable point-of-sale displays and lighting conditions are studied.

★ *New machines*

★ *New methods*

★ *New materials*

are on view at the

PACKAGING EXHIBITION

at Olympia, London, from September 5 to 15. This survey selects those firms and products of particular interest to food manufacturers.

OVER 300 firms, including some 70 from overseas, are showing their wares at the Seventh International Packaging Exhibition being held at Olympia, London, this month from September 5 to 15. The exhibition covers every aspect of packaging—machinery, materials and containers—as well as bottling and package handling. New equipment on show this year includes high-speed automatic filling, sealing and capping machines, cartoning and wrapping equipment, self-adjusting gluer-tapers, bag-making machinery, and bottle cleaning, sterilising and filling equipment. The latest types of metal, glass, plastic, fibre and aerosol containers are on display together with many new types of closure.

Also being shown for the first time are new reinforced papers, improved transparent films with high resistance to moisture, acids, temperature variations, etc., in addition to new sealing tapes, adhesives and inks for package printing. Ancillary equipment includes high-speed labelling machines, printing and converting machinery, checkweighers and electronic devices for detecting foreign bodies in foods.

It is obviously impossible to present even the material of interest to food manufacturers comprehensively in this brief review, and a selection has to be made. The exhibits of the following firms,

"Welbeck"—a design from the studios of the Metal Box Company, Ltd.

well-known and established suppliers to the food industry, give a wide coverage of materials and machinery and are commended to readers as supplying the wants of the food manufacturer.

There will be a full range of filling and capping machines made by **Albro Fillers and Engineering Co., Ltd.,** on show, together with vacuum-operated liquid and semi-liquid filling machines from single-head bench types to fully automatic high-speed rotary models.

Another type will be the vacuum-operated powder filling machines, single-head, 2-head and the fully automatic rotary type: the last has a capacity of between 120 and 150 containers per min. Other filling machines will include gravity-operated fillers and a range of volumetric-type filling machines for liquids.

Also on view will be capping machines for metal or plastic caps, both single-chuck fully automatic and 4-head fully automatic.

Other machines are for applying stopper corks and for applying lever lids, etc. Conveyors and other types of equipment for the bottling and packing trade will be on display.

The Rose Bros. 5 I.S.T. twist and sachet wrapping machine, of which several are shown here, is another exhibit on the Baker Perkins stand.

The **Baker Perkins** group of companies, which includes the Forgrove Machinery Co., Ltd., and Rose Brothers (Gainsborough), Ltd., is now one of the largest in the world concerned in the wrapping and packaging machinery field, and the products of both subsidiary companies are being displayed in a comprehensive display of machinery occupying one of the largest areas in the exhibition.

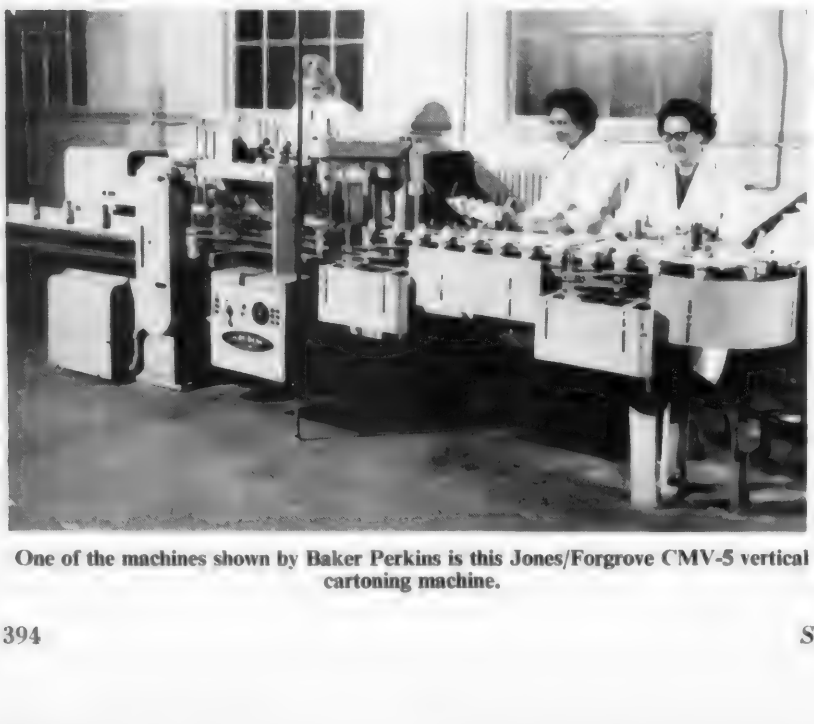
A central feature of the stand will be a Forgrove cut and wrap machine linked to a Rose Brothers stick wrapper. More than twenty machines will be shown, including the following:

Forgrove 4F large packet biscuit wrapping machine. This versatile machine is designed to wrap loose biscuits in a single row in a single or double wrapper with, if required, a label on both ends of the packet. The biscuits are spring-gripped so that it is possible to wrap fragile biscuits without damaging them. Different sizes and shapes can be easily handled using interchangeable parts.

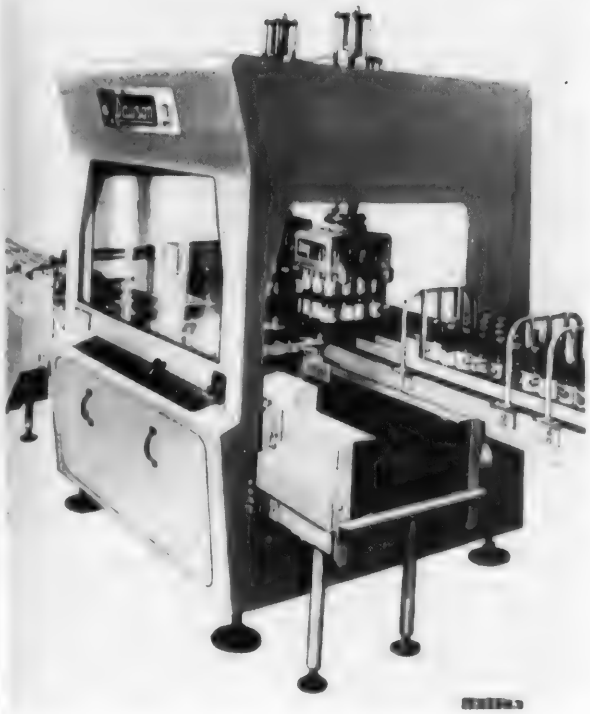
The well-known BW-6 has been used for wrapping many kinds of article, including fruit, fish and confectionery. One of the many variations of the basic BW-6 machine will be shown wrapping, among other things, reams of paper in polythene.

Another machine is the Forgrove Flowpak and several models will be exhibited. Any article which can be carried inside a tube of wrapping material by belts gripping the sides or top and bottom can be wrapped on one of the many versions of this machine.

The Jones/Forgrove CMV-5 constant motion vertical cartoning machine automatically forms an end-opening type carton from a pre-glued flat, closes the bottom and, after manual insertion of the contents, closes the top. It has been used for a diversity of products.



One of the machines shown by Baker Perkins is this Jones/Forgrove CMV-5 vertical cartoning machine.



Dawson automatic carton unpacking machine.

Rose Brothers S.C.S. is another cartoning machine, designed to meet the needs of manufacturers of powders, cereals and similar granular products. It erects, glues, fills and seals cartons at speeds of up to 55 per minute. Special attachments such as automatic weighers, volumetric fillers and vibratory conveyors can be fitted.

The F.C.W. model by Rose Brothers is for wrapping small cakes or pies of about 4 oz. in weight. It produces a pleat wrap sealed on the underside by heat. Output is 60 to 70 per minute.

One of the best-known Rose Brothers machines in the sugar confectionery trade is the 5 I.S.T. It provides a twist or sachet wrap for various types of sweets of irregular shape. Output of double end twist wraps is up to 450 a minute and sachet wraps 350 a minute. It can use cellulose film with or without understrip, wax paper or foil. All that is required for alteration of sweet sizes is a change of one feed plate.

Another machine for the confectionery trade to be shown is the C.H.S.F. This is for the high-speed foiling of soft-centred chocolates of varying shapes. It is fitted with an automatic belt in-feed so that it can take chocolates directly from an enrober belt, thus avoiding handling.

The variety, convertability and practical applications of the films made by **British Cellophane, Ltd.,** will be the themes of the company's stand. A range of BCL cellulose and plastic films will be on show illustrating the wide variety now available.

The many different types of *Cellophane* film (including MXXT/A, the most moisture-proof packaging film in the world) will be featured together with BCL polythene, *Polycell* (polythene-coated cellulose film), BCL polypropylene, BCL nylon, BCL p.v.c. and BCL p.v.a. *Styrafoil* bi-axially orientated polystyrene film (made by BX Plastics, Ltd.), for which British Cellophane are sole selling agents, will also be shown.

The convertability and practical applications of BCL films will be illustrated by a wide variety of printed packs—the work of a number of converters—displayed both in kind and by photograph. Goods included among those used to emphasise the diversity and versatility of transparent films for packaging uses are baked goods, confectionery, groceries and quick-frozen foods.

Great emphasis is being placed on the BCL customer service. This embraces technical assistance on all aspects of packaging—films, machinery and package design. The service includes the range of BCL packaging aids: BCL Bias Wrap and Sealing Aid; BCL Carton Wrapping Aid; BCL Multi-packaging Aid; BCL Polythene Wrapping Aid; BCL Cut-Off Device.

A range of suitable automatic and semi-automatic packaging machinery are also being demonstrated on the stand, to illustrate the ease with which transparent films can be handled.

Sales and technical service representatives will be present on the stand to advise on transparent packaging for both home and export markets—BCL claim to be the world's largest exporters of cellulose film.

On show on the stand of **Dawson Bros, Ltd.,** for the very first time at any exhibition will be their automatic carton unpacking machine, believed to be the only machine of its kind designed and manufactured in Britain.

It is available with single, double or triple heads to handle up to 24 cartons per minute, and can be made to suit any range of bottles from ⅓ pint to quart and ¼ litre to litre. Alternative parts enable it to be changed over from handling one size of bottle or carton to another in a matter of minutes.

The machine accurately spaces the incoming cartons and halts them in the unpacking position. The grab heads descend on to the bottles and at the same time depress a locating frame which squares up the sides of the cartons. Nylon fingers grip the bottles around their necks and gently lift them out and deposit them on to the conveyor leading to the bottle-washing machine.

The machine will handle cartons with or without flaps. The un-

"Kingfishers"—a design from the studios of the Metal Box Company, Ltd.

packing operation is entirely pneumatic, and the air consumption is roughly 0·75 cu. ft. per carton handled. An air supply of 60/80 p.s.i. is required.

The other machine on the Dawson stand is the *Layland* patent destoppering machine, manufactured by W. Layland, Ltd. This unit is designed to remove even the most stubbornly secured closures. It will handle any range of bottles with internal or external thread closures.

After being removed the stoppers pass direct by tube to collecting containers. Changing over from one size of bottle to another takes only a few minutes, and the quick release chucks on the head enable instantaneous removal of damaged closures or débris without disturbing any of the machine settings.

These machines will be supported with photographic and diagrammatic displays illustrating the wide range of washing and mechanical handling equipment manufactured by the firm. Also illustrated will be many of the complete bottling installations undertaken by the firm.

The main feature of the stand of **Fisher's Foils, Ltd.,** is a very wide selection of aluminium foil retail food packs. These demonstrate the importance of good finish, achieved by the company's large foil photogravure printing plant.

Enormous interest is currently being aroused by accelerated freeze drying, and the company has been studying packaging problems connected with this technique. Examples of suitable foils for A.F.D. foods are being shown. Demonstrations are being given of foil sealable by either heat or pressure only. Foil packs for frozen foods are available for examination.

The company has developed a fully heat-sealable foil for the automatic wrapping of cakes on machines such as the Baker Perkins BW5/6. Details are available of the special foil offered for the production of containers and multi-compartment trays.

Two machines new to this country are being displayed by **Foodtech, Ltd.** The centrepiece of their exhibit is the Hellipack fully-automatic edible casing and sausage machine for continuously producing cased sausages. As both casings and sausages are formed inside the machine, there is no need for either natural or synthetic casings to be used. This machine is being shown for the first time at this exhibition. It delivers individual sausages ready for packing in pan-ready condition without the necessity for deskinning.

Also being shown is an electronic batch weigher new to this country, which weighs free and semi-free flowing materials automatically and continuously. The

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It's called a 'MINI'.
It's the fantastic new 'baby' of a **FULL RANGE** of manual and electrically-controlled dispensers, applicators and overprinters by *Tickoply*—the name that means today's smartest self-adhesive labelling.

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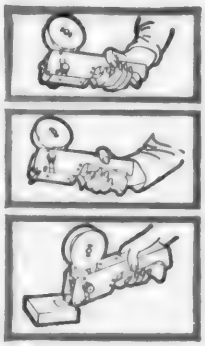
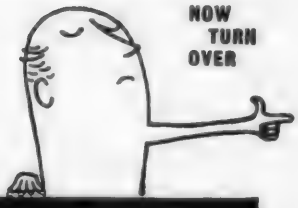


1 PRINT
You squeeze the grip—the ticket is printed.

2 DISPENSE
You release the grip—the printed ticket is released for sticking on.

3 APPLY
You apply the 'gun' to the object's flat surface and pull down—PRESTO!



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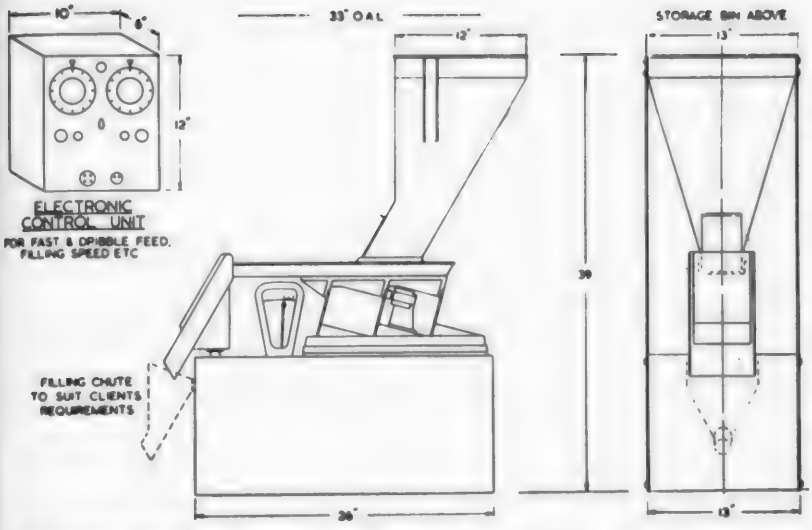


Van Gelder automatic checkweigher supplied by Foodtech, Ltd., showing dimensions.

machine employs no electric motors, the weighing mechanism is completely enclosed, and it is controlled electronically.

Demonstrations are being given of the Hellipack system for wrapping fresh and frozen meat in edible films. Meat wrapped by this system can be displayed without loss of weight or natural juices, giving them extended display life.

This year the stand of the **Glass Manufacturers' Federation** will be larger than at any previous exhibition. Among the special features on view will be a selection of recently designed British glass packs; the surprising variety of uses to which a standard jar can be put; a display of foreign glass packs, showing goods not normally packed in glass in this country; and the historical development of the jam jar, milk bottle, beer bottle, soft drink bottle and medicine bottle.

The value of the Consumer Acceptance Testing Service will be illustrated by the various stages in the testing of a product which has recently been successfully brought out in a glass pack.

On the stand of **Gordon and Gotch, Ltd.,** is the biggest display ever of the well-known *Bubblepak* range of transparent display cards and dispensers, which although introduced only four years ago is now used for over 500 different consumer products in 30 industries. A demonstration is being given of one of the pneumatic heat-sealing machines used to anchor the plastic bubbles to the display card.

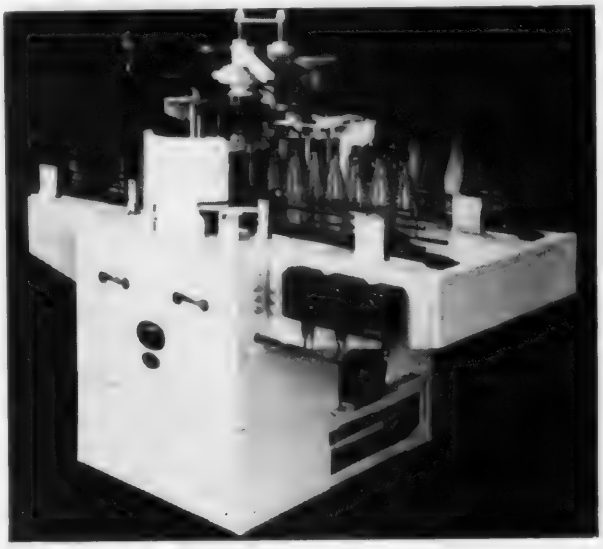
A recent development of this method of display is a self-service display stand with the plastic bubble cut away to allow quick and easy refilling as the contents are sold. A new gravity feed dispenser now available is suitable for, among other goods, packaged confectionery.

Gordon and Gotch have been appointed the first U.K. agents for the Wolkogon range of strip-packaging machines made in Germany, which is being demonstrated at the exhibition. A feature of the range is that each machine can rapidly be changed over from one product or material to another, and a foolproof method for precise centering of printed matter over the packaged product is provided.

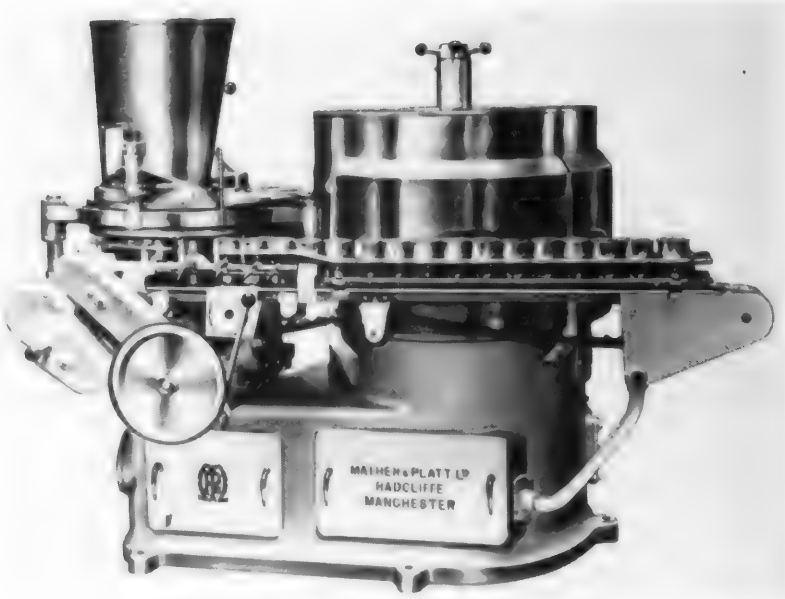
The models being exhibited are a tablet packaging machine, a combination strip-packaging machine with automatic feed, liquid, powder and pill packaging machines, a catch cover sealer, and a tablet counter and filler.

Model TVC/U is a fully automatic strip-packaging machine with an output of 12,000-14,000 tablets per hour and incorporates built-in counting, cutting, perforating and "easy tear notch" devices. This machine has a wide field of application, including the packaging of dragees. A gravity feed vertical tube supplies the dragees to the same feeding nozzle used for tablets and supplements the mechanical counting, cutting, perforation and printing location —thus allowing greater versatility and permitting a change over from tablets to dragees in one operation.

For direct mail publicity and sample distribution is model MS/II, a semi-automatic catch cover sealing machine which heat-seals *Cellophane* or aluminium



This Layland destoppering machine is being shown by Dawson Bros., Ltd.



Mather and Platt high-speed solid and liquid filler.

strips into printed covers. Simple to operate, the model is equipped with an automatic ejector and has an output of 800-1,200 covers per hour. The machine is easily installed and transportable and, like all Wolkogon machines, is supplied ready for immediate operation with motor and all electrical fittings.

Model LA/I is for the packaging of various liquid or paste products into heat-sealable materials, including paper. The machine has a capacity of 40-80 sachets per minute and is fitted with a foolproof mechanical steering device for printed materials. If desired, electronic means can be fitted.

An extensive range of taping and labelling applicators specially designed for use with *Speedfix* pressure sensitive materials is being shown by **Industrial Tapes, Ltd.,** One of these is the pad applicator, S.E.603, which applies self-adhesive lid seals at the rate of 300 per min. A smaller version, the S.E.6030, also on show, is suitable for banding premium offers and the making up of carded products, working at the rate of 60-80 seals per min.

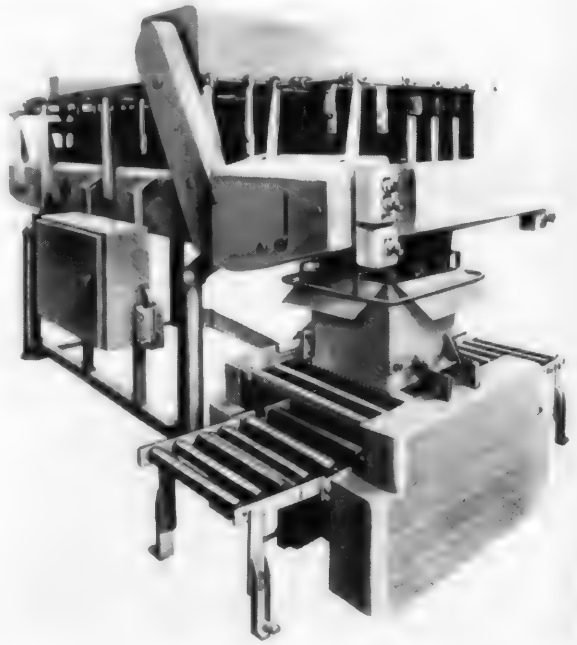
The Derby Sealer Company's range of self-adhesive label dispensing units is also being shown, together with the new extensive range of *Speedfix* labels on film, foil, paper and plastic bases, and *Speedfix* pressure sensitive tapes.

Machines exhibited by **Manesty Machines, Ltd.,** comprise the *DryCota* 900 combined tablet making and compression coating machine, the *Rotapress* high speed tablet machine, the new *Layerpress*, the new drum mixer and the stainless steel water still.

The *Layerpress* is an entirely new rotary tablet machine designed for the production of two- and three-layer tablets, and can be used for producing normal or multi-layer tablets without removal or replacement of feed frames, hoppers or cams. It is made in two ranges, the 47 series producing a maximum diameter of 7/16 in. with an output of 420 to 1,500 per min., and the 39 series producing tablets up to $\frac{5}{8}$ in. diameter with an output of 350 to 1,250 per min.

Machines from the extensive range of filling and packaging machinery made by **Mather and Platt, Ltd.,** are being exhibited. These include several Standard-Knapp designs of which the firm are authorised manufacturers.

One exhibit is a high-speed solid and liquid twin-head filler which will handle a wide range of solids and liquids either separately or in combination. The filling head for solids has twelve adjustable telescopic measuring chambers, and the feed hopper incorporates special features to prevent damage and eliminate dead corners. The liquid filling head will handle any



Mather and Platt JCB vertical packer.

free flowing liquid and has sixteen special rubber valves which ensure very accurate fill with minimum spill. The standard arrangement for feed and discharge conveyors is tangential to the filling heads to avoid spill at high speeds but other arrangements can be employed. The filler can be direct-coupled to most seamers for line processing and will operate at speeds of 250 containers per minute, or more in some cases.

Another machine is the JCB vertical packer which is designed primarily for packing bottles into partitioned crates or fibreboard cases, but is suitable also for packing cans or canisters into partitioned or non-partitioned fibreboard cases. Output is approximately 17 cases or crates per min. and simple change parts enable one machine to handle a variety of containers or cases.

The Standard-Knapp designs on view are the type 806 package packer, the SK 455 *Glu-Liner* and the 429K *Glu-Line* kit. The first is an economical, reliable machine for loading packages or cartons into cases at up to 16 a minute. It is pneumatically operated. Package collectors can be supplied to work in conjunction with the packer. These receive and then roll, twist, turn and finally present the packages from single or multiple lanes into a co-ordinated and balanced pattern for delivery to the packer.

The *Glu-Liner* type SK 455 is a fully automatic case gluer for solid and corrugated fibreboard cases, which can easily be adjusted for different size cases, and the skip-gap mechanism adjusts itself automatically for varying lengths of case. The machine is being shown with its associated compression unit and gravity roller conveyor extension.

The 429 *Glu-Line* is a forced-feed gluing system supplied in kit form for fitting to existing Standard-Knapp gluers to convert them to the same method of operation as the new SK 455 *Glu-Liner*. The kit replaces the rollers, cams and associated mechanisms and glue pots normally used.

A comprehensive range of the **Metal Box Company's** products are being shown. The Open Top Group are exhibiting, as well as a very wide variety of cans for processed food and beer, cans recently developed for soft drinks and cider. Another exhibit is the *Roltop* can, an unbreakable container with a *Gardex* cap for jams and other non-processed foods. Requiring no labelling, it can be printed in durable colours and is suitable for closing with or without vacuum.

The General Line Group are showing the following: aerosols in tinplate and aluminium for food and other purposes; the *Plexicap* series of aluminium extrusions, from small diameters for the pillar packing of tablets to larger capacities, both full aperture and "necked-in," for the bulk packing of tablets, capsules, etc., and all dry products; the round *Nuvac* and the oblong *Floseal* vacuum sealed tins developed originally for tobacco and now being used as well for lozenges and pastilles; aluminium foil containers; the *Autocap* bottom-filled slip-lid tin with diaphragm for powders, dry foods, confectionery, etc.; and the *Quickseal* vacuum cap, a quick-release screw cap in a full range of sizes for vacuum or hermetic sealing of liquids and semi-solids packed in glass, which is also suitable for pasteurised packs and is supplied in a full range of sizes.

The Paper Group are showing: the *Diotite* high-speed protective carton system; the new *King-Tuk* economy cartoning machine; the new *Sellex* egg pack; and a full range of multiple packs, including the *Jak-et-Pak* sleeves to hold from two to eight cans, composites, jars or bottles without staples or glue.

Being displayed by the Plastics Group are: *Diothene* and *Densothene* polythene film; coated films in the *Metathene* and *Metacote* range; laminations; *Diosacks*; *Poly-Tainers* (polythene bottles) including the lightweight 1 and $\frac{1}{2}$ gal. sizes for bulk liquids; *Polytubes*; decorated containers and *Polypots*; and the No. 2 unit filler and capper for *Polypots*.

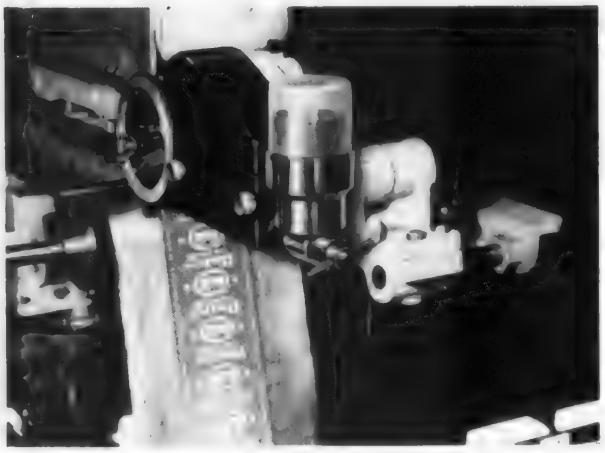
The **Minnesota Mining and Manufacturing Co., Ltd.,** will again be exhibiting a full range of pressure sensitive adhesive tapes together with manual, semi-automatic and fully automatic tape dispensing machines. In addition to a variety of transparent, coloured and printed cellulose and p.v.c. tapes for prepacking and sealing, the new *Scotch* brand No. 898 glass filament tape will be on show. This tape has a tensile strength of 340 lb. per inch of width and will reinforce a fully-telescoped carton with four $\frac{1}{2} \times 6$ in. tape clips for only 1s. 5d., a saving of 3s. 9d. on traditional banding methods.

Two machines which have recently been introduced are specially designed for automatic tape dispensing. They are the automatic labelling machine and the automatic can binder. The first applies printed tape labels to cans at a rate of up to 20 a minute, and the second has been developed to overcome the problem of banding two or more cans together by increasing the operating speed to twice that of similar machines.

At the exhibition there will also be a representative of the 3M Tape Customer Engineering Service which backs these and other machines produced by the company.

Machines being exhibited and demonstrated by **Newman Labelling Machines, Ltd.,** comprise labelling machines, gumming machines, printing machines, combined thermoplastic labelling and gumming machines, and a cap lining machine. The labellers comprise: the model 24A strip gumming labelling machine, which handles labels up to $5\frac{1}{8} \times 6\frac{7}{8}$ in. at a maximum speed of 40 per min.; the model 3C all-over gumming labelling machine suitable for applying labels to flat surfaces at a maximum speed of 40 per min.; and the model 6B automatic labelling machine for cylindrical objects with a speed of up to 60 labelling operations per min.

The gumming machines comprise the model 1D, which accepts labels up to 6×12 in. and gums



"Codareel" model 120X coding and marking machine shown mounted on a Rose type D. E. F. machine for coding ice cream briquettes.

and dispenses them at any speed by depressing a touch bar, and the model 2D, a slower version of 1D with a more positive feed, allowing thicker and tackier adhesives to be used.

The printing machines are the model 1F which prints by double offset impression cylindrical objects such as glass vials and ampoules and plastic and metal containers up to $1\frac{3}{8}$ in. diameter at up to 100 per min., and the Arbis 5FO, an Italian silk screen printing machine for cylindrical objects, complete with firing-in oven, for permanent printing of glass containers and tubes at up to 37 per min.

The cap lining machine is the model 3E which inserts and presses home automatically precut wads of cork, board or other material into metal or plastic bottle caps at up to 150 per min., depending on the size of cap.

The thermoplastic labelling and gumming machines are the model *Hefix*, a new fully-automatic version of which will be shown for the first time, and the model *Thermac*, a thermoplastic label dispenser which is an entirely new model, in which precut "delatic" type labels are placed in a label box and by finger touch control the heat activated labels are delivered one by one to the operator.

Purdy Machinery Co., Ltd., are showing a single head *Rotamatic* labeller which applies up to three labels simultaneously on round bottles, a *Linamatic 65* labeller for simultaneous application of front and back labels, a *New Way E.5* can labeller for front labelling, including all-round neck bands, a *Universal* semi-automatic labeller for applying up to three labels simultaneously to containers of various shapes and sizes, a *Junior* semi-automatic labeller primarily for single body labels on round bottles, although it can simultaneously apply body and neck labels to round bottles up to 10 oz. size, a *Bantam* bench model labeller for applying one or two labels to small containers, a *Prestofix* hand labeller for applying single labels to various size containers, and a *Mixamatic* gum conditioner and dispenser.

The firm's associate company, **Farrow and Jackson, Ltd.,** are displaying on the same stand a *Farjak* pressure filter, 6-head *Bancroft* vacuum filler, hand and power label gumming machines, hand and power screw cap tightening machines, belt and slat conveyors, pressed steel storage bins and general bottling sundries.

On the stand of **Sauven Marking Machine Company** will be the following equipment: *Codedge* label dating and coding machines; *Codapack* units for attachment to conveyors or case sealing machines to print cartons or paper sacks; *Codareel* printing units for coding or pricing on all types of reel-fed packaging machines, or for continuous printing on all materials in strip or web form; hand, treadle and power operated perforating machines; and *Baselock* marking and printing units.

"Codapack" model 10 coding and dating machine fitted with metal locking rings on the type drum.

A new *Codapack* printing unit which has recently been developed will be shown for the first time. It is of greatly improved design, having a 360° movement of the type-drum, and a new and improved inking system. The unit is held firmly against the cartons being marked by totally enclosed compression springs, which allow the unit to be used on either the left or right hand side of the conveyor line, or over the top. A sharp and clear print can be made in any predetermined position on each carton. Baselock type is used which

is available in any size or style, using either separate letters or figures, or complete words or legends made up in one piece in the form of logotypes.

Where separate letters or figures are used, the type-drum can be fitted with metal-locking rings which will hold the type rigidly in place. Alternatively, where logotypes are employed the type-drum is fitted with interchangeable sleeves so that the type-matter can be altered in the minimum of time by having spare sleeves on which the desired type change has already been set up.

These units are available in three sizes, each having a maximum printing length of 15 in. and with maximum printing heights of 1, 2 or 3 in. respectively.

A new development being shown by **Signode, Ltd.,** is a power strapping machine which straps, seals and cuts strapping in a matter of seconds. It requires no operator and has no buttons or controls. Once the machine is loaded with strapping and seals the whole process is completely automatic.

Another development as a result of many years of research by the company is a new type of cold rolled strapping, which combines its own natural advantages with the ductility and strength of heavy duty or hot rolled strapping.

An improved power strap feeder is being shown which applies straps quickly and in correct alignment round large packing cases, crates, boxes and bales. It can be operated by one man, and equal tension for every strap is ensured by using a pneumatic or electric combined strapping machine with the power feed.

Also being displayed is the standard range of Signode hand tools together with a series of pneumatic and electric strapping machines.

Three developments are featured on the **Venesta Foils** stand. These include a sterilisable pack, a pack for A.F.D. foods, and a foil/polyester film laminate.

The fully sterilisable foil laminate when formed into a pouch, provides an alternative to the can in some applications. Manufactured from a 0·001 in. high density polythene faced to a 0·025 mm. foil, it can be heated in an autoclave for 20-60 min. at a temperature of 230-240°F.

Also being shown is a highly protective pack of paper, foil and polythene laminate for A.F.D. foods. The paper part of the "sandwich," which can be varied to suit individual requirements, is laminated to a 0·025 mm. foil backed with 0·001 in. polythene.

Its barrier properties ensure the exclusion of light, moisture and oxygen, which cause these products to oxidise and develop off flavours. Pouches formed of this foil laminate can be gas flushed and then sealed under partial vacuum, ensuring a long shelf life.

The third new product is a laminate of 0·025 mm. foil and 0·0005 in. polyester film (the I.C.I. brand is known as *Melinex*) giving what is probably the toughest flexible barrier known.

Polyester film has been used for packaging bulky items such as hardware, but its application to foods has been limited because its barrier properties are little better than polythene. However, when laminated to foil a wrap is produced that is extremely tough, with good scuff resistance and excellent barrier properties.

An aluminium foil/polyester laminate stuck to either composition cork or pulp board is becoming increasingly favoured as a liner in metal or moulded screw caps because of its excellent properties in withstanding the pressure and drawing which takes place when these caps are screwed down. A similar laminate, but using pure tin foil, is employed in a variety of closures for the capping of spirits for world-wide export, the biggest application being with the Kork-N-Seal lever cap.

In addition, this laminate offers a good wrap for vacuum packing and is ideal as a heavy duty overwrap. It will give excellent protection at the corners, which are usually the weakest point.

On the stand of John Kimbell and Co., Ltd., is being shown a a new machine made by **Vickers-Armstrongs (Engineers), Ltd.** This is a *Formseal* machine typical of a range of six designed to pack products in all-plastic rigid containers. The machine on show will be producing rectangular packs suitable for packing cheese, cream, salad dressing, etc. All types of thermoformable sheet can be used, and high impact polystryene, rigid p.v.c., high density polyethylene, polypropylene and polyflex will probably be of the greatest interest to food packers. The packing of frozen foods and of foods which are to be boiled by the housewife can be accomplished with high density polyethylene sheet.

(Concluded on page 405)

This "Formseal" machine made by Vickers-Armstrongs (Engineers), Ltd., automatically forms, fills and seals any kind of thermoplastic container and is suitable for powders, solids, liquids and pastes in a wide variety of shapes.

★ *Speed . . .*
★ *Ease of application . . .*
★ *Versatility . . .*

By Frederick T. Day*

are among the keynotes of the latest

Developments in Labelling Materials and Methods

described in this comprehensive survey of the various kinds of labelling material, their function, and the machines for applying them

MATERIALS used for making unit containers for food packaging cover an extremely wide range. To mention only a few, they include plain and lacquered tinplate, glass and earthenware, waxed paper and board, plastics, metal foils and their laminates, and cellulose films in moistureproof, non-moistureproof and heatsealing forms.

These materials all have to be labelled, sealed and branded, and there is no single adhesive, either liquid or paper-based, which is suitable for all these surfaces. Each kind of surface needs its own special adhesive.

Another consideration is climate. Labels on food packages may have to withstand cold climates or storage in deep-freeze, while others may be exported to hot and humid countries.

The label is a sales promotor

The label not only identifies the product but aids sales impact and consumer choice when goods are displayed in shop window and self-service store. Here goods are sold without the persuasion of the retailer, but are selected by container style, brand name, attractive appearance and advertising.

* Samuel Jones and Co., Ltd.

LABEL PAPERS

Although this survey is not concerned with label design, shape and colour, these are very important in label production, and specialists are available to advise on these. A product's sales appeal is assisted by a colourful label which follows the shape of the container.

Self-adhesive labels

Among the latest types of label paper is the self-adhesive pressure sensitive type. The adhesive may be applied to various bases such as paper, fabric, metal-lined paper, etc., and labels of this type have the great advantage that they are always ready to be applied without heat, water or other activation.

These labels can be white or multi-coloured and of various shapes, and are mounted on backing sheets for printing by the various processes. For use they are peeled off the backing sheet, either mechanically or by hand, and the method of application will depend on the quantity used and the type of package. They leave no residue on the container's surface and they are ideal for pricing and coding prepacked meat, cheese, bacon and other foods.

The latest type of self-adhesive label becomes permanent to the surface on which it has been applied some seconds after application. Self-adhesive labelling is now used both for permanent labelling and temporary labelling additions at the point of sale, and both methods are suitable for waxed cartons, glass containers, cellulose film, plain and lacquered tinplate, polythene, foils and laminates. Such labels remain fast under refrigerated and deep-freeze conditions.

New coated acetate films

In this field there is a new form of tacky label designed for both large product labels and window bills in full colour. The paper is easy to remove and any deposit can be sponged away. A vast new field of label work is being opened up by cellulose acetate films coated with pressure-sensitive adhesive. What are termed "separation splits" are incorporated into the label so that the backing sheet can be peeled away before application.

The use of self-adhesive labels in various forms is growing, particularly in the packaging of water-sensitive products.

Laquering of printed labels

New processes of lacquering are replacing some forms of spirit varnish treatment. New cellulose,

A group of labelled foods using heatfix, self-adhesive and gummed labels.

nitro-cellulose and super-high-gloss treatments render the printed surface completely waterproof, non-finger marking, dustproof and hygienic. They bring out the colours in printed work and the lacquers no longer yellow with age and crack as formerly, and are non-creasing, scuff and flake proof. The finished printed sheet may be folded without surface cracking.

Such processes are not costly considering the enhancement given to the label. Both printed papers and boards may be surface coated and given added lustre.

Heatfix papers

Heatfix, heatseal or thermoplastic papers have become established for many kinds of labelling, sealing and branding operations. Many types of film have inherent heat-sealing properties and may be heatfixed by manual hot plates or hot irons, or by attachments to packaging machines. Many types of basic papers and fabrics can be coated with a heat sealing medium, and the latest development in this field is that coatings may be applied to basic papers in reel or sheet form in strips, the material then being used for seam-sealed wrapping.

Heatfix labels may be used for such difficult surfaces as transparent films, both plain and printed, rigid plastics such as polystyrene, p.v.c. and urea formaldehyde (depending on the amount of plasticiser), and plain and lacquered tinplate. The main advantages of heatfix labels are that they are clean in application, being activated by heat and pressure, so that there are no adhesive smears, finger marks, wrinkles or other defects.

Labelling delicate items

For delicate items such as flour confectionery, biscuits and other goods sensitive to heat and moisture, the delayed type of heatfix label paper should be used. In this method the label is heated away from the product and applied as a separate operation, no heat or moisture coming into contact with the package. The label adhesive remains tacky several seconds after heating is finished.

The instant tack heatfix label must be applied immediately after it has been heated, and good label positioning usually depends on the operator's skill.

The various heatfix compounds may be applied to the printed papers either in the reel or flat sheet, so that manufacturers may have their own printed material coated all over or in strip form. There are heatfix papers coated on either side so that they may be combined together in ply form.

Header bag labels

Many foods are packed in viscose film bags which employ a header bag label. These are printed labels which fold over the head of the bag and form a closure for its mouth. The bag's contents thus remain completely visible. The printed matter includes the product's brand name, its price and other relevant details, and when applied the print can be seen on either side when the bag is displayed.

The use of heatfix labels as header bag labels is comparatively new, and is much safer and more hygienic than the use of the more conventional kind applied with wire stitches. They are neat and act as an efficient barrier, retaining moisture if desired and keeping out dust.

Pregummed label papers

The latest developments in the pregummed label field are adhesive papers which adhere to difficult surfaces such as lacquered tinplate, smooth indented glass surfaces, wooden surfaces, etc.

An electric foot-operated tapeshooter taking gummed strips up to 4 in. wide which moistens and cuts any two lengths of tape from 4 to 50 in.

The adhesive is based on either dextrin or gum arabic.

Folding cartons of white lined or coated box board often have such springy end flaps that they resist the usual end closing operation when ordinary seals or adhesive are used. A new "quick-tack" gummed label paper has been developed which speedily adheres to such springy flaps and facilitates the closing operation.

Autofeed gummed paper is a recent development which can be incorporated in various types of gummed label paper manufacture. Its main advantage is that it will feed in with perfect ease on fast running printing machines without clinging. This type of paper also works well on a guillotine, cutter or punch producing small labels. There is no curl or edge cling on a batch of punched out labels.

Both dextrin and gum arabic compounds of various kinds may now be coated on to any basic paper in one, two or three coats, depending on the degree of tenacity required. All types of gummed label papers are available in sheets of standard sizes for printing presses and on reels for rotary printing presses, and can be pre-perforated in any arrangement to suit the label size or application.

Permanent labels for high class foods

High class labelling, fully permanent and designed as an integral part of the container surface, is being satisfactorily carried out with the slide-off cellulose transparent transfer label. New methods of screen printing make this technique a first class method of high-class or luxury food labelling. The method is ideal for glass containers as the contents are visible through the transparent parts of the label.

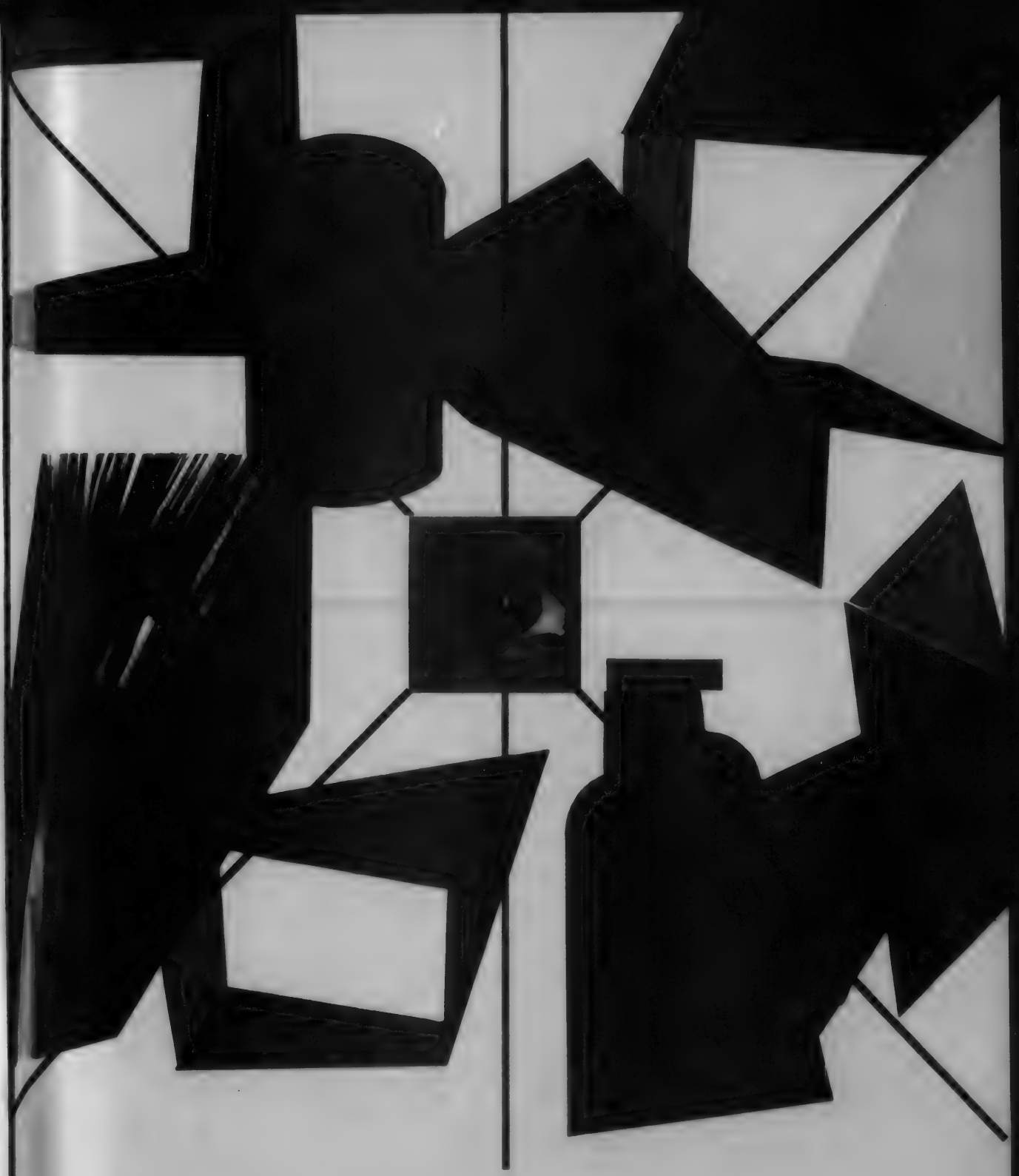
In the case of coloured jellies, liquids, etc., the label adds greatly to the bottled product's appeal, especially under artificial lighting. Transfers are very easy to apply; they are flexible and strong and can be moved to the best position by hand. The printed label is merely dipped in warm water and slid off on to the container surface. Once applied it is permanent.

No special skill is needed to print these transfers, and the most suitable printing method is the silk screen process. In this process, very short runs in several colours are economically possible, which is not the case with other processes such as letterpress or litho. Where large numbers of labels are required, however, the latter processes are recommended.

Kraft glued labels

For some purposes, particularly the bulk packing of food in wooden cases, a really strong label is required, and kraft labels are

An electric tacky tape dispenser for roll label application.



VENESTA FOILS

a new approach to packaging

(see over)

✱ THE PAGE OVERLEAF is printed rotogravure by Venesta Foils in 7 colours on ·009mm. aluminium foil gum-laminated to 84 grm. paper

foil is

PROTECTIVE—
moisture-proof
grease-proof
dirt and bacteria-proof
odour-proof
light-proof

VERSATILE—
coated
embossed
plastic-laminated
paper-laminated
heat sealable

ECONOMICAL—
on performance,
the lowest-priced
material of all

HARD-SELLING—
flattering
sparkling
impelling
upgrading

PUT FOIL'S TOP TEAM TO WORK FOR YOU

Venesta Foils offer a complete service to help you give your packaging the impact and protection of foil

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WRITE OR 'PHONE TO VENESTA FOILS LTD., THORN HOUSE, UPPER ST. MARTIN'S LANE, LONDON W.C.2 TEL: TEMPLE BAR 4399

specially made for this type of work. Such labels have a very high breaking strength and are coupled with a very tenacious animal glue. They are an ideal closure for containers with springy end flaps; they may be used as end labels for products such as salt which are wrapped in kraft. Brown kraft is of course also widely used for glued tape manufacture.

Label storage

All stocks of printed labels on various types of adhesive papers should be suitably stored. Cold stone floors, damp conditions, strong sunlight and draughts should be avoided. The heat from steam pipes tends to make paper curl and distort. Labels are best stacked on wooden shelves away from such pipes and kept in their original wrapping until required for use.

Nowadays labels may be supplied individually packed in 500's or 1,000's or in sheet or reel form, and are often wrapped in an inner waxed paper lining which resists damp and atmospheric changes.

Pallet trays are best for storing labels as stocks may then be moved without man-handling.

Printed labels in most cases are best stored on their side so that the weight of the package does not cause blocking. This, however, rarely happens these days as labels are suitably packaged to avoid this. It is hardly necessary to add that label stocks should be used in rotation.

LABELLING MACHINES

In the case of water-activated labels, even and efficient application of moisture to the label is important, and this is best achieved by means of the brush moistening type of labeller. Too much moisture will wash away some of the adhesive, while too little will hardly activate the gum.

There are many types of bench-mounted hand moisteners for achieving good label application. The latest type of brush moistening appliance which will soon be available has a capacity of 12 in. or more and will handle large merchandise labels.

New machines to work on the bench or near the production line dispense self-adhesive labels automatically. Labels in sheet or reel form may now be applied by automatic dispensers which peel off the backing paper before application.

Portable labelling and sealing machines

For heatfix label application there are portable hand irons for marking products in store or warehouse. These can be used for label activation. Conveniently sized appliances are also available for tacky labels and tapes. A new portable tackytaper dispenses a length of adhesive tape for resealing broken packages, or for labelling, coding and securing as required. Any length of tape may be applied and the appliance is particularly valuable for resealing cartons from which small quantities have been taken.

Glued tape moisteners and dispensers

The latest type of tapeshooter measures off two separate lengths of glued tape, moistens them and applies them to carton, case or bale by the operation of a foot pedal. For most types of packing case, two separate lengths of tape are needed, and the new machine is specially designed for such forms of sealing. Machines of this type take widths of tape up to 8 in., while hand-operated machines use even wider tapes.

"Plug-in" tape machines are now available so that packing and sealing has become fully automatic and safe. New tapes of sisal and fibreglass are immensely strong, and when used with corrugated fibreboard packing cases offer wide scope for the complete protection of delicate and fragile goods.

Packaging Exhibition

(*Concluded from page 401*)

One of the new features of the machine is the elimination of the vacuum pump in the forming stage. Instead, pressure forming is generally employed and contact heating can be provided in cases where oriented film has to be used.

The output of the machine depends on the speed of filling, size of the package and type of sheet used, but as an example, a conventional 5 oz. table jelly could be cast into a plastic shell and sealed at a rate of approximately 5,000 per hour.

The **Wiggins Teape Group** is demonstrating its interest in flexible packaging and wrapping. Certain mills in the Group specialise in high grade packaging base papers, such as genuine vegetable parchment, white and coloured Glassine, glazed imitation parchment, S/C and M.G. opaque bleached Sulphite, S/C and M.G. opaque bleached Kraft, etc. These base papers are made to meet individual specifications and are quality controlled to ensure that they are regular in all respects and provide the converter or consumer with the characteristics required, bearing in mind the need for economic production conditions.

Within the Group there are a number of converting, merchanting and agency companies, equipped to provide speciality service to the packaging trade. Products for packaging will be displayed on the Group stand in the form of printed, laminated and coated papers, produced from base papers all specially made by mills in the Group. Also on display will be plain or printed foils, films and laminates combining foil, film and paper. The Group also offers through their agencies and merchanting companies, packaging boards, liners and similar materials. Among the many speciality items will be included contact labels, Bakewell Non-Stick Parchment, etc.

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Packaging Machinery for A.F.D. Foods

New Vickers machines for small and large outputs

Parallel with the development of commercial accelerated freeze-drying plant by Vickers-Armstrongs (South Marston) Ltd., their associated company, Vickers-Armstrongs (Engineers) Ltd., are working on suitable packaging machinery for these revolutionary foods. This article describes the basic requirements of A.F.D. packaging and the machines which this company have already available or are in course of developing for both free-flowing and portioned A.F.D. foods, for small and large outputs.

TWO features must be particularly considered in the design of packaging machinery for A.F.D. foods. In themselves they are neither novel nor original, but in this case are of major importance. To take advantage of the long keeping qualities of these foods they must be packed in an inert atmosphere with a minimum of oxygen, and as they are fragile they must be protected from pressure and movement.

Air extraction and gas packing necessary

The first requirement demands a mechanism to evacuate the air before admitting nitrogen to the container, because mere flushing with nitrogen in the hope of removing the air is not sufficient. The second requirement is met by ensuring that the nitrogen in the inner container is maintained at slightly below atmospheric pressure. Being flexible, the inner container is deformed by atmospheric pressure and the contents are held together lightly, but positively. Finally, the insertion of this flexible liner in a carton gives the necessary protection from pressure.

Pilot scale equipment

To cover the gap between hand filling, closing and insertion into cartons of sachet liners and semi-automatic plant, Vickers-Armstrongs (Engineers), Ltd., are producing a machine which has two automatic cycling sections. The upper section has a weighing head which delivers and holds a preset weight of product until a carton is placed under the delivery chute. The lower section comprises two boxes situated on either side of the operator who is seated in front. In each of these boxes the following cycle takes place: filled cartons are inserted and the box lid closed; a vacuum is drawn in box and carton; inert gas is admitted; finally the inner carton liner is sealed. When this cycle, the time

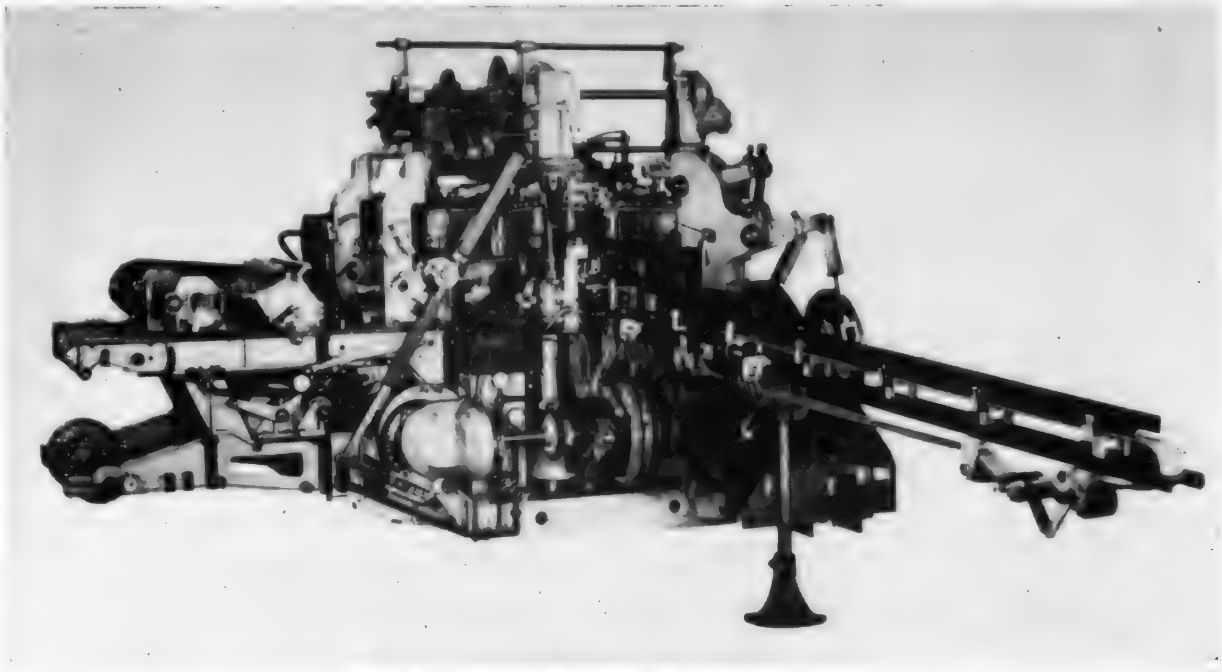
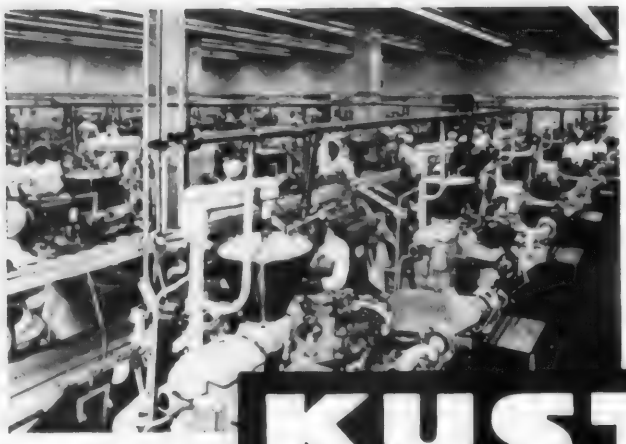


Fig. 1. A production machine for large carton outputs.



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of which is adjustable, is finished the boxes can be opened. Because the time cycle of the sealing boxes is longer than that of the weighing unit, two are used so that output is increased. The output of this machine varies according to product and operator skill, but should be of the order of 12 per minute.

The machine illustrated in Fig. 2 is arranged for packaging free moving products, i.e. those which can be fed by vibratory or similar means, but precut or formed portions can be just as readily packed if they are brought to the operator on a conveyor belt.

Production machines

For outputs between this machine and a full production line multiples of this pilot-scale machine may be used, but an automatic machine of adequate speed is obviously preferable. For production outputs the range and scope must obviously be much more extensive, and machinery is being produced to handle both free flowing and portioned food in a number of ways.

For free flowing products at speeds between 30 and 72 packs per minute, a group of 3 machines coupled together will be available, consisting of a double package making machine linked by a conveyor to a vacuum/gassing closing machine with a weighing filling machine mounted over the conveyor.

These machines are similar to those shown in Figs. 1, 3, and 4, differing in size for various carton sizes and outputs.

The double package making machine produces linered cartons from precut carton blanks and reels of the required lining material. The lining material is cut and formed around blocks of the required carton size in such a manner that in all cases the same face of the material meets for adhesion. This action is essential so that multilaminates can be used to give the necessary impermeability to air, moisture, etc. The carton blanks are formed and glued around the completed liners and delivered by the machine to a conveyor which conveys them under the weighing unit.

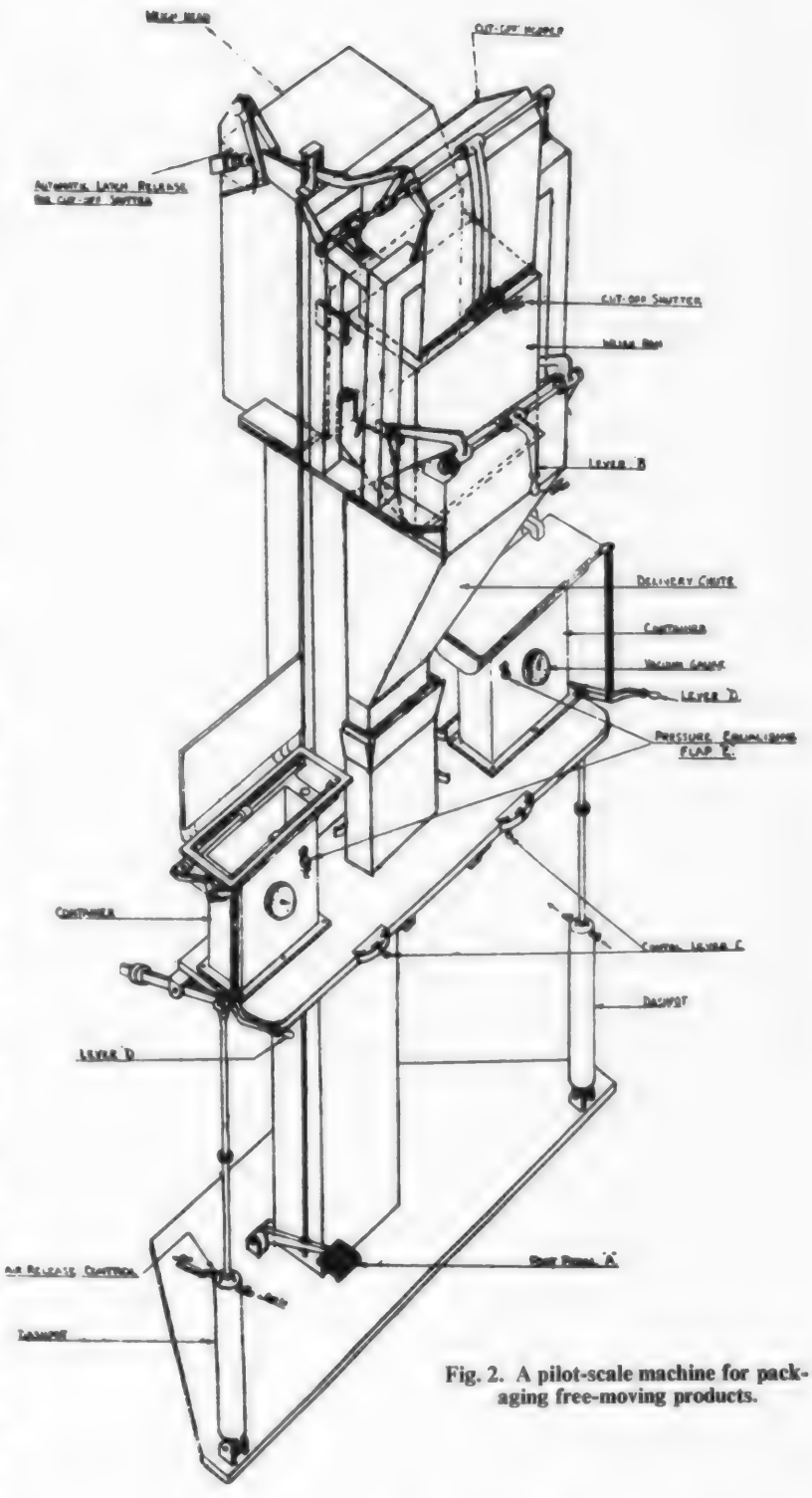

Fig. 2. A pilot-scale machine for packaging free-moving products.

The weighing unit, which is normally fed by vibrating feeder, has two or more weighing heads according to the output required. These heads, which operate on a pneumatic principle without knife edges, etc., allow the product to fall vertically until the correct weight has collected in the weigh pans, when the falling product is

cut off and no further weight added. As soon as the carton arrives under the chutes beneath the weigh pan, the weighed material is released into them and the cycle recommences.

Finally the filled cartons pass to the closing machine which receives each carton into a separate chamber, draws the necessary vacuum and fills the carton with nitrogen to slightly sub-atmospheric pressure. Still in the nitrogen atmosphere the inner lining is sealed, following which the carton passes out on to a final closing station at which the inner liner is folded over and the carton glued and closed.

We thus have a group of machines which work automatically, requiring only to be kept supplied with lining material, carton blanks, food product and adhesive, etc.

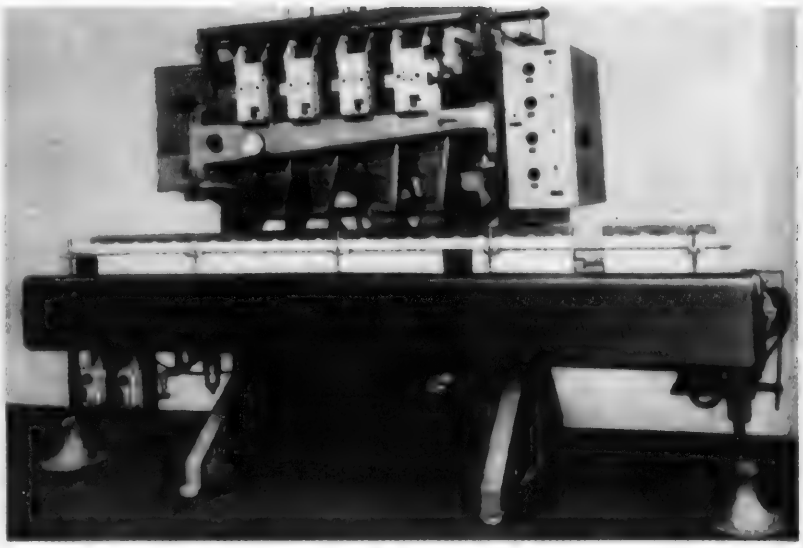

Fig. 3. A multiple-head filling machine for cartons.

Higher outputs

It is anticipated that in the near future the output of this line will not be sufficient and a speed of 120 packs per minute will be required. For this purpose the above line is being virtually integrated into a unit machine. The services required will be the same, but floor space will be saved with consequent easing of supervision and loading of cartons, etc.

Running parallel with this free flowing product plant, equipment is to be produced both for the combined packaging of portioned foods such as steaks, hamburgers, fish fillets and fingers, etc., and free flowing foods, and for por-

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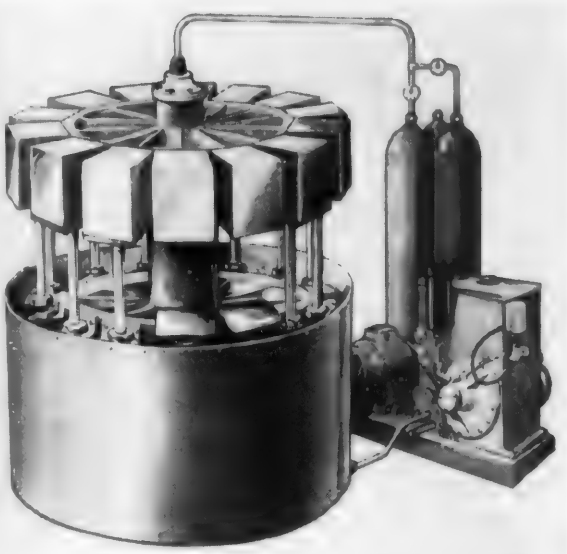

Fig. 4. A rotary filling machine with facility for gas-filling.

tioned food alone. Both these plants will use different techniques.

For the combined free flowing and portion pack line, heat/pressure forming techniques are being used in a machine to produce in a continuous process containers formed in suitable plastics, fill them, subject them to the necessary vacuum/gassing process, and seal them. The output of this machine will be variable according to the nature and size of the goods to be packed, but a maximum figure of 120 packs per minute is envisaged.

Packaging of complete meals

If required on this machine, groups of products to form a meal can be packed separately but cut off in groups, i.e. one could pack a meat portion together with two vegetable portions, each in separate divisions.

Food portions will vary from irregular shapes such as steaks to formed blocks such as fish fingers. With this in view the feeding section of the portion packaging machine will be kept extremely flexible so that feeding can range from hand placing to belt feed. This machine will take the product, envelop it in a suitable gas filled pouch and finally insert the pouch into a pre-made carton which will be automatically fed to the machine from a hand charge hopper.

The output of this machine will vary according to the type of pouch material used, which will affect the linear speed at which the material can be run, and to the type of handling equipment required. Again a top speed of 120 portion packs per minute is considered possible.

We thus have a range of machines designed to package A.F.D. foods with emphasis on the protection of the product, flexibility of machine use, and economy of operation.

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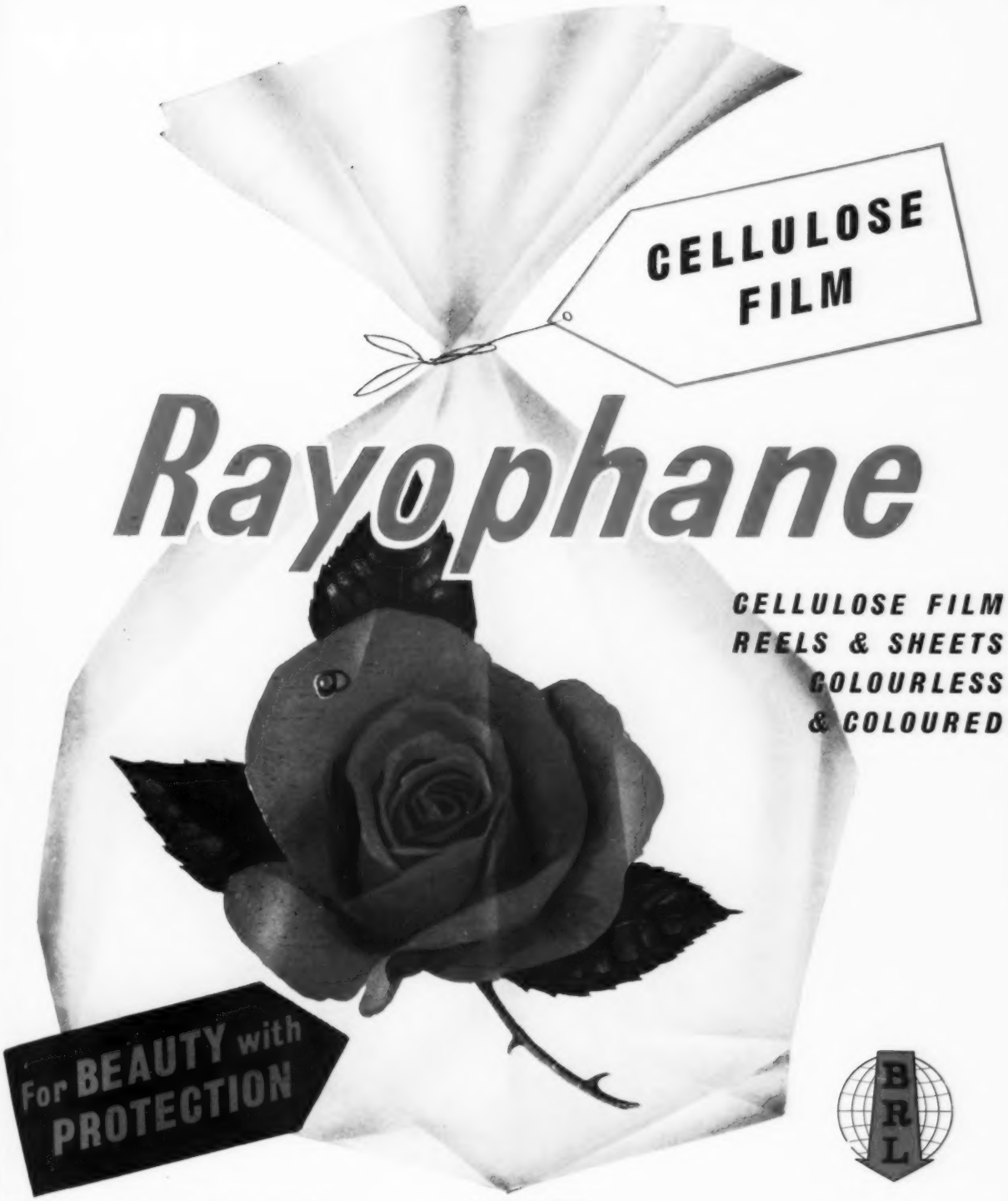

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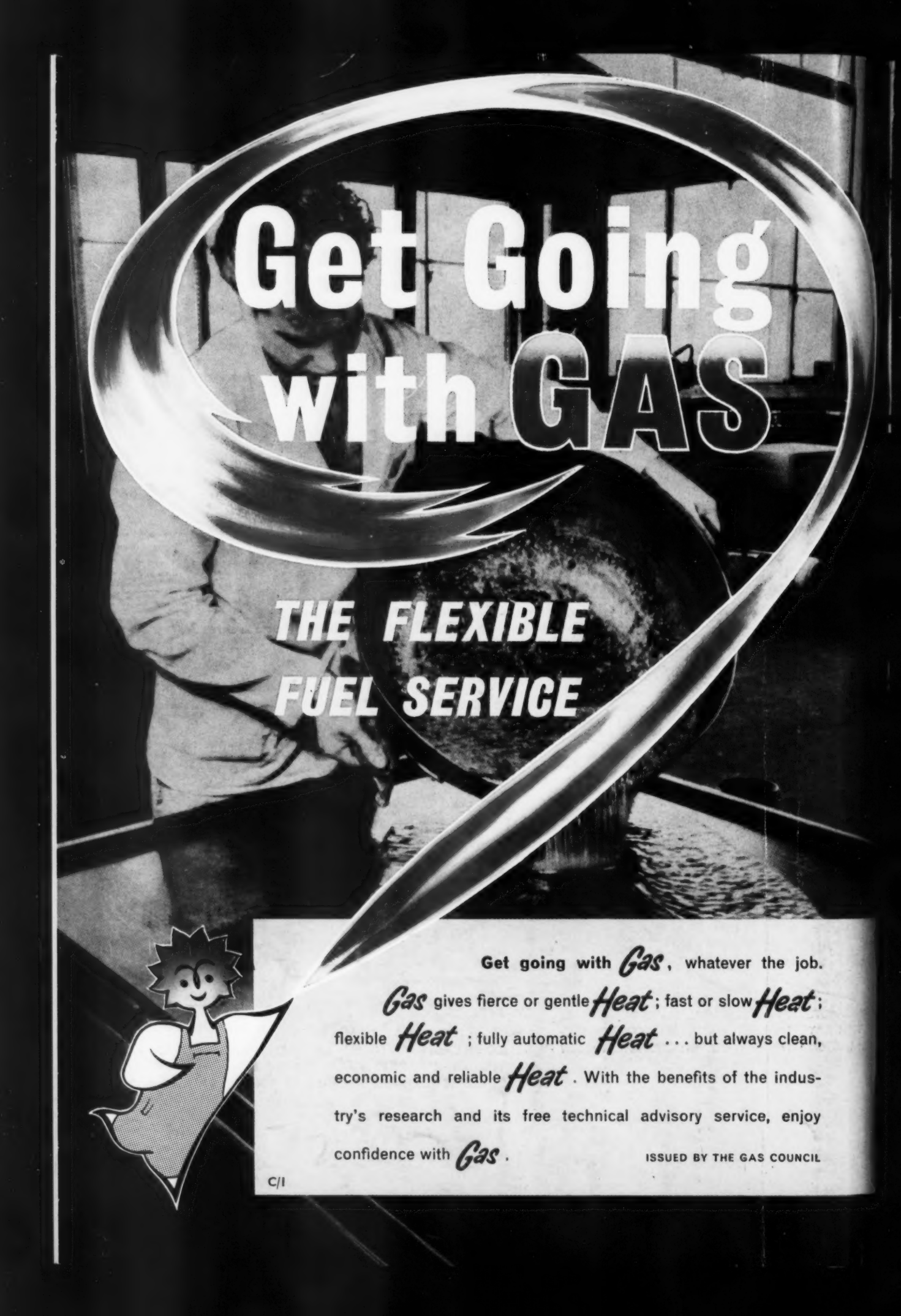

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